

Summary of comments on draft study plans for the Grant Lake Project (No. 13212) (List of Abbreviations and Acronyms attached)

Comment Number	Date	Affiliation (Individual)	Report Reference	Comment ¹	Kenai Hydro, LLC (KHL) Response
General/Additional Study Requests					
1	06-04-10	KWF	PAD	Thank you for the opportunity to comment on the PAD. Please provide a return receipt and if you could clarify how these comments will be incorporated into the process it would be appreciated. It is unclear who receives these comments, if they are transmitted to FERC.	This response to comment table will become a part of the project record submitted to FERC with the draft license application. The table is also posted on KHL's website (www.kenaihydro.com).
2	07-06-10	M. Cooney	PAD	In recognition of significant probable negative project impacts to the local and unique quality of life, individual businesses, and local economies, Socio-economic issues related to this project should not be evaluated peripherally or as a by-product of other studies as currently proposed by HEA. I again request HEA immediately establish an independent Technical Working Group to comprehensively identify and to investigate these issues. The Socio-Economic TWG membership should be significantly comprised of recognized Alaska professionals in the field, and residents from local project area communities, including local business owners. I look forward to participating and working with that Technical Working Group.	A comprehensive protection, mitigation, and enhancement proposal is necessary before socio-economic information can be fully considered. Socio-economic information consistent with FERC regulations, and commensurate with the scope of the project will be provided in the final license application Exhibit E (see 18 CFR §4.41), and will be available for review and comment by stakeholders.
3	07-06-10	ACE	PAD	Forest-related industries-how much income and investment is currently generated by forest-related industries including the non-consumptive values of the forest economy including: Direct use, human development, community benefits, scientific values, off-site benefits, ecosystem services, and passive uses and then assigning a dollar value to each.	See response to Comment 2.
4	07-06-10	ACE	PAD	Value of wild salmon watersheds-the PAD acknowledges (p61) that the Kenai River system is one of the most productive salmon rivers <i>in the world</i> . No mitigation is proposed as a result of the proposed projects because wild salmon are	A comprehensive protection, mitigation, and enhancement proposal will be presented in the final license application following completion of resources studies and consultation with resource agencies and stakeholders. In addition to resource effects analyses, a developmental analysis consistent with FERC regulations will be

¹ The full text of comments is included in this column, unless otherwise noted. Where the full text is not included, a reference for the full comment is included.

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				impossible to replace. Is 4.5 MW (actually the reality is much less) of power worth sacrificing the viability of one of the most productive salmon streams in the world? It would be helpful to see a completed cost/benefit analysis that examines what will be lost and gained if this project was to move forward.	included in the final license application to address the effects of recommended environmental measures on project generation and economics and the effects of construction, operation, and maintenance on project economics.
5	07-06-10	ACE	na	Additionally, we recommend a separate and stand-alone working group to analyze the socioeconomic impacts.	See response to Comment 2.
6	07-06-10	ACE	PAD	Economic Impacts-who benefits and who pays?	See response to Comments 2 and 4.
7	07-06-10	ACE	PAD	Community Identity, Subsistence and Environmental Justice	The scope of the currently proposed Cultural Resources Study includes evaluation of subsistence use in coordination with the terrestrial and aquatic resource study efforts.
8	07-06-10	ACE	PAD	National Interests-the Chugach is a federally-owned forest known for its recreational values and surrounds the project area. The Black Mountain Research Natural Area is in close proximity to the project area and there should be some research completed about if the development could have impacts to the area.	FERC's Scoping Document 2 identifies the geographic scope of analysis as sufficiently broad to address potential impacts on the Kenai lake-Black Mountain Research Natural Area. Consultation with the USFS will continue throughout development of the project proposal to ensure consistency with the Chugach National Forest Plan.
9	07-06-10	ACE	PAD	Potential Conflicts with Goals or Objectives of Other Agencies and Landowners	The PAD and FERC's Scoping Document 2 identified comprehensive plans and planning documents that will be considered in evaluating the project proposal.
10	07-06-10	ACE	PAD	Irreversible and Irretrievable Commitment of Resources	The FERC licensing and NEPA process is designed to fully consider economic and environmental resource issues associated with project development.
Terrestrial Resources Draft Study Plan					
11	07-02-10	USFS	p.3, and all document Figures	The vicinity and facilities map is not the same one displayed in the scoping document (SD1), other draft study plans or at the public meeting on June 2, 2010. All study plans should display the same, updated maps.	KHL filed with FERC a revised project description and facilities figure on August 13, 2010. This description was also considered in FERC's Scoping Document 2. An updated facilities description and figure is included in all study plans. Pg. 3 Terrestrial Resources Study Plan
12	07-02-10	USFS	Botanical Resources	The draft study plan for botanical resources was reviewed. We have no recommended changes at this time for sensitive and invasive plant survey or wetland mapping methodology.	KHL appreciates the USFS review of the proposed methodology.

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13	07-02-10	USFS	Botanical Resources	No mention is made of the timber resource. The timber resource (commercial or otherwise) needs to be quantified in the area influenced by the proposed lake level change. Vegetation clearing likely will need to occur around the lake perimeter and volume estimates will be required on National Forest System lands.	A timber resource inventory, which would evaluate timber resources in the area of potential inundation around Grant Lake, was added to the Terrestrial Resources Study Plan. Pg. 15 Terrestrial Resources Study Plan
14	07-02-10	USFS	Wildlife Resources (p. 16, PP2)	Change to note that the Management Indicator Species (MIS) and Species of Special Interest (SSI) may occur IN or NEAR the project area.	The Terrestrial Resources Study Plan was revised to reflect the recommended change. Pg. 17 Terrestrial Resources Study Plan
15	07-02-10	USFS	Wildlife Resources (p. 16, PP3)	What data supports the statement “the project vicinity provides only a small to moderate amount of wildlife habitat relative to other areas of the northern Kenai Peninsula?” If there are no data to support this statement, it should be removed.	The statement indicated was based on conclusions of authors of earlier studies (APA, 1984). The Terrestrial Resources Study Plan was revised to reflect the recommended deletion. Current habitat conditions will be discussed in the Terrestrial Resources Study Report and draft and final license applications.
16	07-02-10	USFS	Wildlife Resources (p. 17, PP1)	Trumpeter swan and bald eagle nest surveys are not conducted annually, only when budget permits.	The Terrestrial Resources Study Plan was revised to clarify nest survey frequency. Pg. 18 Terrestrial Resources Study Plan
17	07-02-10	USFS	Wildlife Resources (p. 17, PP1)	A goshawk nest is suspected to occur in the project vicinity, but no nests have been located. Change references for (Benoit 2009) to (Benoit 2010).	The Terrestrial Resources Study Plan was revised to reflect the recommended changes. Pg. 18 Terrestrial Resources Study Plan
18	07-02-10	USFS	Wildlife Resources (p. 17, PP6)	Check with the Alaska Department of Fish and Game (ADF&G) for data regarding moose counts for the Grant Lake area more specific than a general count for the whole GMU 7.	The Terrestrial Resources Study Report will provide updated information based on consultation with appropriate agency personnel. Pg. 19 Terrestrial Resources Study Plan
19	07-02-10	USFS	Wildlife Resources (p. 18, PP2)	Cite the data to support that brown bears are sparsely distributed and the number of bears the area could support. The APA 1984 data is too old to represent current conditions. Consider asking Sean Farley from ADF&G for more recent information on dens, telemetry data, and habitat.	As stated in the study plan, one purpose of the studies and consultation is to update information collected in the area in the early 1980’s. The Terrestrial Resources Study Report will provide updated information based on observations and on consultation with appropriate agency personnel. Pg. 19 Terrestrial Resources Study Plan
20	07-02-10	USFS	Wildlife Resources (p. 19, PP1)	An aerial survey is only sufficient to determine nesting habitat for bald eagles and trumpeter swans; it is insufficient to find northern goshawk nests. The Chugach Land and Resource Management Plan	The Terrestrial Resources Study Plan was revised to include goshawk nest surveys following USFS protocols. We appreciate the assistance of USFS personnel in planning the survey effort.

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				(LMP) guidelines for raptor nest protection, including northern goshawks, are on page 3-31. The current protocol for goshawk nest surveys is a ground based method, rather than aerial. Forest Service protocols require two surveys per year for two years. We are happy to assist in identifying areas that need to be surveyed.	Pg. 22 Terrestrial Resources Study Plan
21	07-02-10	USFS	Wildlife Resources (p. 19, PP2)	Ospreys are unlikely to occur in the project area during the breeding season.	The Terrestrial Resources Study Plan was revised to include this clarification. Pg. 21 Terrestrial Resources Study Plan
22	07-02-10	USFS	Wildlife Resources (p. 20, PP1)	<p>Flying at less than 150' Above Ground Level (AGL) looking for nesting birds is extremely disturbing to nesting birds and other wildlife. Forest Service aerial surveys do not allow flights below 500' AGL.</p> <p>The investigative studies special use authorization held by Kenai Hydro, LLC does not authorize the use of aircraft to conduct wildlife or other surveys. If you wish to conduct aerial surveys, please work with the Forest Service to amend your permit. The following mitigation is standard in Forest Service permits that use aircraft and these should be incorporated in your study plan:</p> <ul style="list-style-type: none"> • Helicopters will maintain a minimum of 1,500 ft. AGL distance from all observed wildlife. • Helicopter flights will be avoided within ¼ mile horizontal or 1,500 ft. AGL separation distance of active bald eagle nests. If it is unknown whether a nest is active, helicopter flights will avoid the nest by a ¼ mile horizontal or 1,500 ft. AGL distance. • Helicopters will not hover, circle, or harass any species of wildlife in any way. • Aircraft will adhere to No-Fly Zones as identified by the district wildlife biologist, who identifies mountain goat and Dall sheep concentration areas to be avoided by helicopter flight paths. Zones are based 	The Terrestrial Resources Study Plan was revised to reflect comments regarding use of aircraft. Observation from boats of cliffs around Grant Lake was included in the survey plans for cliff nesting raptors. We appreciate the data on bald eagle nests supplied by the USFS in 2010. Multiple modifications throughout the document including Appendix G

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				<p>on a separation distance of 1,500 ft. from animal and habitat survey data.</p> <p>As stated previously, aerial surveys are not appropriate to locate northern goshawk nests. The Forest Service conducted bald eagle nest surveys in 2010 and has already provided the data to HDR, so further surveys are not needed. Trumpeter swan surveys have been conducted in the past and suitable nest habitat does not occur, so these surveys are not needed. To reduce disturbance to wildlife, we recommend scanning the project area from boats during shorebird surveys to determine the presence of cliff nesting raptors rather than using aircraft.</p>	
23	07-02-10	USFS	Wildlife Resources (p. 23, PP 4)	<p>The statement “There are no known concentrations of any water bird nesting or feeding areas near the Project (APA 1984; Benoit 2009)” should be reworded to state that the Forest Service has not conducted surveys for water bird nesting or feeding areas at Grant Lake.</p> <p>Please remove the citation of Benoit 2009 from the statement “Although their current conservation status is unclear, they are listed in the Sea Duck Joint Venture Species Status Report and are of particular concern to resource agencies (Seaduck Joint Venture 2008; Benoit 2009)”. While they are a concern, Ms. Benoit did not state that they are of particular concern to the Forest Service. Also, Ms. Benoit did not state that “Common loons and yellow-billed loons have been observed on Grant Lake and nesting habitat for loons is present on Grant Lake (APA 1984; Benoit 2009).” They may be present, but Ms. Benoit does not recall seeing them and does not know if they have nesting habitat there.</p>	<p>The Terrestrial Resources Study Plan was revised to reflect the recommended changes.</p> <p>Pg. 26 Terrestrial Resources Study Plan</p>
24	07-02-10	USFS	Wildlife Resources (p. 26, PP2)	<p>Please change Kenai Peninsula to the Seward Ranger District in this statement “Open water habitat that supports waterbirds on the Kenai Peninsula is limited (Benoit 2009).”</p>	<p>The Terrestrial Resources Study Plan was revised to reflect the recommended change.</p> <p>See response to Comment 22 regarding aircraft.</p>

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				Again, the special use authorization for investigative studies currently does not authorize use of aircraft for surveys.	
25	07-02-10	USFS	Wildlife Resources (p. 26, PP4)	<p>Please contact ADF&G and review more recent literature on brown bears to validate the statements listed in the following paragraph. The statements in boldface are not consistent with our knowledge of brown bear behavior.</p> <p>Bears. Brown and black bears are found throughout the Project vicinity during the spring, summer, and fall. They may be found in a variety of habitat types, but brown bears tend to prefer open habitats, particularly shrub and tundra communities at higher elevations, while black bears tend to prefer forested habitats at lower elevations (APA 1984). Forage resources and denning habitat as determined during 1982 surveys are shown in Figure 6 (APA 1984). The distribution of both species of bears is affected strongly by food availability. Emerging grasses, forbs, and other herbaceous plants are critical foods in spring, whereas spawning salmon and berries are critical foods in late summer. Both species enter dens during October or November and remain there until early to mid-May, with maternal females entering dens before and emerging later than males (APA 1984).</p> <p>Brown bears are found in most habitat types and to our knowledge do not prefer shrub and tundra communities or high elevations in this area. Denning habitat information that is more current should be obtained from ADF&G. Moose are also an important food source in the spring. Most brown bears emerge from their dens around mid-April.</p>	<p>The Terrestrial Resources Study Plan was revised to reflect the recommended change.</p> <p>Pg. 28 Terrestrial Resources Study Plan</p>
26	07-02-10	USFS	Wildlife Resources (p. 26, last PP)	If you plan to use the survey data the Forest Service collected on brown bear dens while doing bald eagle nest surveys on May 6, 2010, please note that a complete den survey was not conducted in the	The Terrestrial Resources Study Plan was revised to clarify the brown bear denning survey will include all areas potentially affected by the Project.

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				project area. The survey only included habitat along Grant Creek and the hills adjacent to Grant Lake. The Forest Service survey protocol does not allow flights below 500' AGL as stated in the study plan. Again, the current special use authorization for investigative studies does not authorize the use of aircraft for wildlife surveys (see above).	Pg. 29 Terrestrial Resources Study Plan See response to Comment 22 regarding aircraft.
27	07-02-10	USFS	Wildlife Resources (p. 27, PP3)	Please document how the moose range and travel corridors identified in Figure 7 were determined. They do not match the ranges identified by ADF&G.	The Terrestrial Resources Study Report will provide updated information based on consultation with appropriate agency personnel. Pg. 29 Terrestrial Resources Study Plan
28	07-02-10	USFS	Wildlife Resources (p. 32)	<i>Raptor Nest Surveys</i> - Please note that goshawk surveys should be conducted in mid and late June.	The Terrestrial Resources Study Plan was revised to reflect the recommended change. Pg. 24 Terrestrial Resources Study Plan
29	07-02-10	USFS	Wildlife Resources (p. 32)	<i>Terrestrial Mammal Surveys</i> - Please note that an additional bear den emergence aerial survey should be conducted in mid-May 2011 if you want a complete survey of the project area. In addition, bats have been reported to roost in the historic cabin on the west end of Grant Lake. If the project could affect water levels to the extent that this cabin might be affected, a bat survey of the cabin must be conducted.	See response to Comment 26 regarding bear denning surveys. A bat survey of the historic cabin has been completed and will be reported on in the Terrestrial Resources Study Report.
30	07-06-10	USFWS	Goals and Objectives	Because of the wide-ranging movement of fish, birds, and wildlife (in general) throughout this ecosystem, Kenai Hydro must put the potential effects to birds and wildlife in a landscape/watershed context. Grant Lake is part of the larger Kenai River watershed and the proposed studies are too limited in scope.	The draft and final license applications will analyze study results and provide information commensurate with the scope of the project. The license application will include analysis adequate to inform a cumulative effects analysis in FERC's EA.
31	07-06-10	USFWS	Goals and Objectives	Before we can effectively evaluate the potential effects of the proposed project on our trust resources, we must have well-defined, statistically valid, measurable, achievable/realistic, specific and quantifiable objectives for each study component with a clearly specified level of precision and accuracy such that the objectives are statistically sound. (See USFWS comment letter p. 9 for full	The Terrestrial Resources Study Plan was revised to clarify goals and objectives. Multiple modifications throughout the document

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				detail of comment.)	
32	07-06-10	USFWS	Botanical Resources (p. 5)	On pg. 5, reference is made to invasive plant species being present on the Chugach National Forest and adjacent State, Borough, and private lands. Construction and maintenance of facilities may disperse invasive plants throughout the area. A detailed plan will be necessary to effectively address this issue, with specific protocols mandated for contractors and others working in and around the project area. Proper implementation of measures to avoid the spread of invasives will be critical throughout the life of the project.	A plan, which will be included in construction BMPs, will be developed as necessary based on potential Project effects and will be detailed in the draft and final license applications.
33	07-06-10	USFWS	Wetland Mapping	For wetland mapping, we recommend using other sources [than NWI maps], such as the Kenai Peninsula Land Cover Classification. (See USFWS comment letter p. 10 for full detail of comment.)	The Terrestrial Resources Study Report will provide updated information based on consultation with appropriate agency personnel and the best current mapping and information. Pg. 15 Terrestrial Resources Study Plan
34	07-06-10	USFWS	Wildlife Resources, Existing Information	Ground-truthing efforts to accurately map wetlands and other habitats in the watershed that may be affected by the proposed project will be necessary. We encourage Kenai Hydro to use Mike Graez's Wetland Mapping and Classification protocol. (See USFWS comment letter p. 10 for full detail of comment.)	Site-specific vegetation mapping and wetland delineations of the Project foot print was included in the Terrestrial Resources Study Plan.
35	07-06-10	USFWS	Wildlife Resources, Existing Information	Without the appropriate data to support the statement that "the Project vicinity provides only a small to moderate amount of habitat for wildlife resources relative to other areas of the northern Kenai Peninsula", we suggest you omit or revise such accordingly. (See USFWS comment letter p. 10 for full detail of comment.)	See response to Comment 15.
36	07-06-10	USFWS	Wildlife Resources, Existing Information	Again, on Pg. 16, reference is made to the eastern end of Grant Lake being preference habitat for snowshoe hare, lynx, beavers and moose, with the area likely also providing nesting habitat for some waterfowl and passerine species. However, there does not appear to be any mention of analyzing the potential effects to wildlife from displacement when the area [eastern end of Grant Lake] is inundated. Appropriate studies will be necessary to ascertain	The Terrestrial Resources Study Plan is designed to collect vegetation and wildlife data in potentially affected areas along the Grant Lake shoreline. If inundation will occur based on the final Project design proposal, potential effects of this inundation will be discussed in the Terrestrial Resources Study Report and presented in the draft and final license applications.

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				the potential effects to all of the terrestrial resources utilizing the habitat around Grant Lake, especially those areas that will be flooded as a result of project operation.	
37	07-06-10	USFWS	Wildlife Resources, Existing Information (p.16)	We believe mountain goat surveys are a necessity and that these surveys should be conducted to ascertain potential effects from the proposed project. (See USFWS comment letter p. 11 for full detail of comment.)	The Terrestrial Resources Study Plan was revised to include observation of mountain goats during other wildlife surveys on Grant Lake. Pg. 36 Terrestrial Resources Study Plan
38	07-06-10	USFWS	Wildlife Resources, Existing Information	On Pg. 17, the Draft TRSP again references outdated studies to infer that Dall sheep will not be studies since they mainly occur on the higher ridges and slopes beyond the areas potentially affected by the project. Yet, it states that as with goats, sheep sometimes move to lower altitudes. While they are generally high country animals, Dall sheet sometimes occur in rocky gorges below timberline. We encourage Kenai Hydro to contact ADF&G for further information about sheep in and around the study area.	The Draft Terrestrial Resources Study Plan and PAD provide information available through 2009. The Terrestrial Resources Study Report will provide updated information based on consultation with appropriate agency personnel.
39	07-06-10	USFWS	Wildlife Resources, Existing Information (p. 17)	The assumption is made that snow depth and a corresponding lack of winter forage limit moose numbers in the project vicinity... We therefore recommend this and similar assumptions be omitted, and that an appropriate level of study be initiated to support the findings. We encourage you to contact the appropriate ADF&G staff to obtain moose data for this area. (See USFWS comment letter p. 12 for full detail of comment.)	The Draft Terrestrial Resources Study Plan and PAD provide information available through 2009. The Terrestrial Resources Study Plan has been revised to clarify that the information is the result of earlier studies of the Project area. The Terrestrial Resources Study Report will provide updated information based on consultation with appropriate agency personnel. Pg. 19 Terrestrial Resources Study Plan
40	07-06-10	USFWS	Wildlife Resources, Existing Information (p.18)	We reject claims [regarding sparse bear populations] and again recommend further, detailed analysis of brown and black bear movements and habitat in the project area to accurately assess the potential for impacts from the project. (See USFWS comment letter p. 12 for full detail of comment.)	See response to Comment 19.
41	07-06-10	USFWS	Wildlife Resources, Study Methods	[Low level flights] are not acceptable and we are hopeful that HDR utilized USFS aerial bald eagle nest data collected in May 2010. (See USFWS comment letter p. 12 for full detail of comment.)	See response to Comment 22.
42	07-06-	USFWS	Wildlife	Kenai Hydro must not only map eagle nests, but	The Terrestrial Resources Study Plan was revised to reflect an

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	10		Resources, Study Methods	because of the new eagle “take” regulations, should also determine locations of breeding and feeding territories within and adjacent to the project area if the project poses a potential impact to eagles, their nesting, and their young. (See USFWS comment letter p. 12 for full detail of comment.)	emphasis on observing breeding and feeding behaviors of bald eagles in and near the study area. Pg. 20 Terrestrial Resources Study Plan
43	07-06-10	USFWS	Wildlife Resources, Study Methods	Regarding northern goshawks and other raptors, HDR should use the USFS protocol for surveying as appropriate.	See response to Comment 20.
44	07-06-10	USFWS	Wildlife Resources, Study Methods	Breeding landbirds and shorebirds - Nesting along the lakeshore that is to be inundated is an issue with respect to “take” of waterfowl, gulls, and other shorebirds under the MBTA, as “take” will not be authorized. Please explain how “take” will be avoided in the above scenario. Also, please indicate what aspects of the project will impact migratory birds – lake level fluctuations; clearing for roads, powerhouse and transmission lines, etc. Studies commensurate with potential direct and cumulative effects are needed.	The Terrestrial Resources Study Plan, and subsequent analysis of potential effects to be presented in the draft and final license application, will include analysis to address the scope identified by FERC in Scoping Document 2.
45	07-06-10	USFWS	Wildlife Resources, Study Methods	Provide supporting documentation to verify this assertion [that natural lake levels fluctuate 9 ft.], and conduct proper studies to address how far lake levels could rise and expand outward from the current lake edge, and the extent of impacts to breeding landbirds and shorebirds. (See USFWS comment letter p. 13 for full detail of comment.)	Field data will be collected to verify natural, seasonal lake level fluctuations. If inundation will occur based on the final Project design proposal, potential effects of this inundation will be discussed in the Terrestrial Resources Study Report and presented in the draft and final license applications.
46	07-06-10	USFWS	Wildlife Resources, Study Methods (p.22)	On Pg. 22, HDR indicates that Grant Creek is not included in the study area for landbirds because it is virtually impossible to detect signing songbirds along a loud creek corridor. Please explain, in detail, how songbird data will be assessed and quantified for this area, and how relative abundance and density will be determined.	The Terrestrial Resources Study Plan was revised to clarify methods used to collect and analyze wildlife data, consistent with the scope and scale of the Project. Pg. 25 Terrestrial Resources Study Report
47	07-06-10	USFWS	Wildlife Resources, Study Methods	Please explain the rationale to support the association of various species of birds to particular habitats when discussing the type and level of surveys to be conducted.	The Terrestrial Resources Study Plan was revised to clarify methods used to collect and analyze wildlife data. Multiple modifications throughout the document

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48	07-06-10	USFWS	Wildlife Resources, Study Method	Regarding potential effects to migratory birds, there is no mention of how the clearing of the road and transmission line corridors will affect nesting and roosting habitat. An assessment will be needed to determine the extent of direct, indirect, and cumulative effects on migratory birds and their habitat in conjunction with these proposed corridors. The added foot and motorized traffic that will result once roads and other right-of-ways are cleared must be considered in this analysis.	The draft and final license applications will analyze potential Project effects on migratory birds (including corridor clearing and changes in use) commensurate with the scale of the Project.
49	07-06-10	USFWS	Terrestrial Mammal Surveys	We recommend contacting Mr. Sean Farley (ADF&G) and Mr. Jeff Selinger for more recent data on habitat, movement corridors, den locations, etc, for both brown and black bears. (See USFWS comment letter p. 13 for full detail of comment.)	Thank you for the recommendation. The Terrestrial Resources Study Report will provide updated information based on consultation with appropriate agency personnel. Multiple modifications throughout the document based on consultation with aforementioned individuals.
50	07-06-10	USFWS	Terrestrial Mammal Surveys	Opening up access in conjunction with the project could have serious implications to brown and black bears and other wildlife in the area. Den disturbance through site development as well as that resulting from recreational access via snow machine along with newly found hunting opportunities, is likely. (See USFWS comment letter p. 13 for full detail of comment.)	Potential impacts to wildlife from increased access related to the Project will be assessed in the draft and final license applications.
51	07-06-10	USFWS	Terrestrial Mammal Surveys	Anadromous runs are important food resources for brown and black bears. With the potential for fisheries impacts, more information will be needed to ascertain what effects such would have on the brown bear which inhabit the study area. (See USFWS comment letter p. 14 for full detail of comment.)	The Aquatic Resources Study will collect information on fisheries that will be used in the draft and final license applications to address the effects impacts to fisheries might have on other wildlife species.
52	07-06-10	USFWS	Terrestrial Mammal Surveys	Appropriate studies will be needed to ascertain what, if any effects, the proposed lake level increases will have on all terrestrial resource habitats around Grant Lake. In addition, appropriate mapping to show the acreage to be inundated and extent of potential habitat impacts will be required. (See USFWS comment letter p. 14 for full detail of comment.)	See response to Comment 36.
53	07-06-	ADFG	Study	We support the delineation of the zone of inundation	See response to Comment 36.

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	10		Methods	potential along the entire shore of Grant Lake and recommend quantifying the distribution of each riparian/terrestrial habitat type and the relative abundance of aquatic and riparian species utilizing each habitat. We are primarily concerned with habitats selected by waterbirds (waterfowl, shorebirds, loons, gulls and terns) for breeding and those selected by moose for browse, cover and thermoregulation. To evaluate the proposal of increasing lake levels, a quantitative summary of the relative abundance of these species by specific habitat types is needed along with the extent to which these habitats will be inundated. Waterbird surveys should also be conducted for Grant Creek by noting habitat associations with the meso habitats identified in the Aquatic Resources Study and with particular riparian habitat types being mapped in the Terrestrial Resources study.	
54	07-06-10	NPS		<p>NPS's comments on this draft study plan are directed at terrestrial resources associated with recreational use, including watchable and huntable wildlife.</p> <p>KHL's terrestrial resources study should include an evaluation of the potential for land clearing activities associated with construction of the project access road to have ongoing impacts on vegetation due to windthrow and erosion. The evaluation should identify areas along the proposed road, penstock, and transmission line rights-of-way that could be vulnerable to such unplanned or uncontrolled changes because of steep slopes, soil type, and other factors. The effects of any resulting unplanned or uncontrolled loss of forest cover on recreational experience, wildlife distribution and abundance, and water quality should be assessed.</p> <p>Does the proposed study area, which is bounded by the Seward Highway to the west, encompass the full range of habitat utilized by wildlife in the project area? E.g., do Moose, Bear, etc. utilize habitat on both sides of the highway? Where will wildlife</p>	<p>The draft and final license applications will analyze results of the Terrestrial Resources Study, the geotechnical survey, and engineering and design efforts to evaluate and describe potential effects of the project.</p> <p>The Terrestrial Resources Study Report will provide updated information on wildlife use of the general Project vicinity based on consultation with appropriate agency personnel.</p>

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				displaced from the immediate project area during construction likely seek refuge? The study area should include all such habitat. For Dall sheep and mountain goat, this may include areas outside the Grant Lake watershed.	
55	07-06-10	NPS		Do Moose currently utilize the frozen surface of Grant Lake for winter travel? If so, what impact would there be on winter movement between wetland habitat at the eastern end of the lake, and areas west of the mouth of the lake, if the lake were open, or had inadequate ice, for longer periods? Given the animal's popularity for hunting, why are no Moose surveys proposed?	The Terrestrial Resources Study Plan was revised to include a winter survey of moose presence and use of the Grant Lake area. Pg. 32 Terrestrial Resources Study Plan
56	07-06-10	NPS		Why are no goat or sheep surveys proposed? Goats in particular are known to be highly susceptible to disturbance, including helicopter use. How will KHL and FERC be able to evaluate the impact of project construction and operation, including improved access, on goat and sheep populations in the absence of baseline data?	The Terrestrial Resources Study Plan was revised to include observations of mountain goats and Dall sheep. Pg. 32 Terrestrial Resources Study Plan
57	07-06-10	NPS		How would fluctuating lake levels, potentially dewatering wetland habitat in the Inlet Delta and causing changes in vegetation, have on the distribution and abundance of huntable or viewable wildlife species?	See response to Comment 54.
58	07-06-10	NPS		The study plan should include a survey of American Dipper nest sites and foraging areas within Grant Creek. Dippers are known to build nests on creekside cliffs and to feed in fast-flowing streams like Grant Creek.	The Terrestrial Resources Study Plan was revised to include dipper surveys. Pg. 19 Terrestrial Resources Study Plan
59	07-06-10	NPS		A single winter waterbird survey, via helicopter or snowshoe, is unlikely to yield meaningful data about the project area's utilization by such species. Multiple surveys throughout the open water season would be necessary to determine whether the project area provides important winter habitat for waterfowl, and to establish baseline conditions.	The Terrestrial Resources Study Plan was revised to increase the number of winter surveys of Grant Lake wildlife use. Pg. 28 Terrestrial Resources Study Plan
60	07-09-10	USACOE		The proposed study plan discusses wetlands delineation and states that the information will be collected as required by the 1987 wetland	Thank you for the review of the methods.

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				delineation manual and the 2007 Alaska Regional Supplement. This is appropriate.	
61	07-09-10	USACOE		The study plan states that representative boundaries of wetlands will be identified and then wetland boundaries will be drawn using GIS. The method described is appropriate for scoping purposes, however, more detailed wetland delineations information may be necessary to complete the alternatives analysis. For the purposes of determining the amount of direct impacts resulting from the final design, the wetland boundaries must be determined by filed delineations and recorded using GPS.	Comment noted. KHL will continue consultation with the USACOE during development of the Project proposal to ensure the appropriate level of wetland information is available for the final environmental document.
62	07-09-10	USACOE		The Wetland Field Data Form referenced in the study plan and included in Attachment E is incomplete. The second page is missing.	The Terrestrial Resources Study Plan was revised to include the full attachment. Appendix E Terrestrial Resources Study Plan
63	07-09-10	USACOE		The draft study plan refers only to the identification of wetlands. Because we regulate the discharge of dredged or fill material into waters of the U.S., we must know the location and size of all waters that would be impacted by the proposed project. Waters of the U.S. include channels with an ordinary high water mark (streams) and open waters with a mean high water mark (ponds or lakes) in addition to wetlands. Each stream, open water, and wetland that may be impacted by a proposed alternative must be identified, described, and mapped.	The Water Resources Study Plan was revised to acknowledge this information.
64	07-09-10	USACOE		Direct impacts to waters of the U.S. must be identified and quantified for all portions of the project that would involve the placement of fill in waters of the U.S.; this includes any waters crossed by the proposed road and utility corridor, any waters flooded by the raised waters in Grant Lake or wetlands flooded by increased flows in Grant Creek, and any waters that would be filled during the construction of the powerhouse, dam or other structure.	The assessment of Project impacts in the license application will include an assessment of potential effects to all waters of the U.S.
65	07-09-10	USACOE		Secondary impacts to waters of the U.S. must be identified and assessed for each water of the U.S.	The assessment of Project impacts in the license application will include an assessment of potential effects to all waters of the U.S.

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				(See USACOE comment letter p. 2 for full detail of comment.)	
66	07-09-10	USACOE		Cumulative impacts to waters of the U.S. must also be indentified and assessed. Cumulative impacts are the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. The geographic extent may be different for each cumulative impact.	The draft and final license applications will analyze study results and provide information commensurate with the scope of the project. The license application will include analysis adequate to inform a cumulative effects analysis in FERC's environmental document.
67	07-09-10	USACOE		If compensatory mitigation is required, it will be necessary to complete a functional or condition assessment for each water of the U.S. that would be impacted by the proposed project. There are a variety of metrics or methods available. We recommend that you contact us to discuss your selected method, prior to its implementation, to ensure that it is appropriate.	KHL will consult with the USACOE as potential mitigation measures are developed commensurate with the scope of the Project and its effects.
68	07-09-10	USACOE		As we mentioned at the meeting, the Alaska District has written Regulatory Guidance Letter (RGL) 09-02, which provides guidance regarding the evaluation of compensatory mitigation plans to the Regulatory Project Management and the public. We have attached a copy of the RGL to our letter.	KHL thanks the ASACOE for the information.
69	07-06-10	ACE	p.22	In the Terrestrial Resources study plan, it states on p 22 that surveys will be done in June 2010 for landbirds along the road corridor, yet there is no firm plan regarding the placement of the road. Four species of landbirds are listed on the State of Alaska list of Species of Special Concern that likely live in the project area.	The project study schedule has been revised to allow for consultation with agencies regarding a revised Project facilities proposal. The species list for landbirds was reviewed to include State of Alaska Species of Special Concern.
70	07-06-10	ACE		The clearing of the road corridor and possibly a transmission line corridor, will impact the vegetation beyond the edges of the road. Trees along the corridor will have a greater risk of blow down, and invasive plants will have better access into the area. With this area already facing huge swaths of die off due to the spruce bark beetle, an assessment should be made of the standing forest and how taking additional trees will impact the forests recovery.	Results of the Terrestrial Resources Study will be analyzed in the draft and final license applications to evaluate and describe potential effects of the project. A plan to prevent the spread of invasive plants will be developed for Project construction and operation as necessary and commensurate with the Project scope.

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71	07-06-10	ACE	p.15	The plan states that the primary objective of wildlife surveys is to provide existing baseline distribution and abundance information on target species. The plan then refers to studies done in the early 80's. Much has changed in thirty years, and these references should be considered with that in mind. Dramatic changes to forest stocking levels and to understory vegetation and forest structure have changed dramatically over the last 20 years due to extremely high levels of spruce (Sitka, Lutz and White spruce) mortality resulting from a spruce bark beetle epidemic.	Comment noted. The Terrestrial Resources Study Report will provide updated information based on current studies and on consultation with appropriate agency personnel.
72	07-06-10	ACE	p 16	The plan states that no federally listed wildlife species occur in the project vicinity. While this may be true, if FERC considers the geographic scope to be the Kenai River basin (and we fully support this decision), then this statement is not true as the Cook Inlet beluga whale, which is listed as an endangered species, has been documented to occur in the project area. Impacts to their food source will need to be considered.	Scoping Document 2 has defined the geographic scope for cumulative effects as the Kenai River basin and concluded that "extending the geographic scope to include open ocean habitat utilized by beluga whales is not appropriate."
73	07-06-10	ACE		Interesting to note that even though moose have been identified as a management indicator species, that the project proponent has decided not to perform specific surveys. According to local residents, moose are seen quite often in the area, (hence the name Moose Pass), and use the browse on the east end of Grant Lake during winter time (which would be flooded if the dam is built). Again the study plan refers to a one year study performed 30 years ago. Critical moose winter range (willow flats) located on the east end of Grant Lake comprises one of only a very few good winter browse areas in a forested landscape largely devoid of good moose winter habitat.	See response to Comment 55.
74	07-06-10	ACE	p 16	The study admits that the inlet delta at the eastern end of Grant Lake is preferred habitat for snowshoe hares, lynx, beavers and moose. There is no indication that the proponents plan to study the effects of displacing these populations by flooding the area.	The Terrestrial Resources Study area includes the area of potential inundation. See response to Comment 55.

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75	07-06-10	ACE	p.18	[Study plan] states that no more than one or two families of Kenai brown bear would den in the proposed area. Because the Kenai Brown bear is listed as a Species of Special Concern, we believe that the geographic scope of this study should extend beyond the boundaries of Grant Lake. If animals are going to be displaced by the development of the project the study area should be expanded.	Comment noted. Results of studies and agency consultation will be analyzed in the draft and final license applications to evaluate impacts to brown bears.
76	07-06-10	ACE	p.22	We wonder why only the outlet delta area of Grant Lake is included in the study for breeding landbirds.	Breeding habitat in other areas of the shoreline of Grant Lake is limited due to topography and vegetation type. However, incidental observations of all wildlife will be recorded during surveys of the shoreline for breeding waterbirds.
77	07-06-10	ACE	p.23	The draft study plan optimistically states that the intent of the bird surveys is to sample enough points to “ensure that all breeding landbirds in the area are documented”. Though this is a laudable goal, we feel it is a misleading and inaccurate statement that should be amended to reflect the realities of field work.	The Terrestrial Resources Study Plan was revised to clarify the data that will be collected, commensurate with the scope of the Project. Pg. 24 Terrestrial Resources Study Plan
78	07-06-10	ACE	p. 23	The study states that there are no know[n] concentrations of any waterbird nesting or feeding in the project area, yet many have testified that they had seen trumpeter swans during the winter at the outlet of Grant Lake which provides a relatively rare, ice-free zone. We are glad that the proponents plan to visit the site in the wintertime to see if they can document this, however, we are skeptical if the use of a helicopter is an effective way to do wildlife studies and encourage a less intrusive method.	Comment noted. See response to Comment 22.
79	07-06-10	ACE	PAD	Identify denning and foraging habitat for the Kenai Brown Bear in and adjacent to the project area. Recognize that this is a species of special concern and that reducing the number of fish available is going to impact the species. More access to the area will open it up for more disturbances and the possibility of out-migration of bears to other areas of higher densities of both people and bear which always lead to a higher mortality rate for the bears. The number of kills in defense of life and property always goes up along roadsides, so we can easily	The Terrestrial Resources Study Plan was designed to collect data regarding Kenai brown bear in the Project area. Potential effects of the Project on the brown bear will be evaluated in the draft and final license applications.

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				predict that bears will be impacted. The natural and existing wildlife travel corridors need to be identified, and every effort made to avoid contributing to the decline of this species. There needs to be a scientific study to determine more about this species, and not rely on anecdotal evidence or information 50 years out of date.	
80	07-06-10	ACE	PAD	Grant Lake shoreline, outlet and the head of Grant Lake are all significant habitat for birds and further studies need to be done to identify specific species and numbers of birds who are using the lake to feed and nest.	See Terrestrial Resources Study Plan.
Recreation and Visual Resources Draft Study Plan					
81	07-02-10	USFS		<p>There are numerous references to the “proposed Iditarod Trail” throughout the document. The Iditarod National Historic Trail (INHT) is more than proposed. It was designated by Act of Congress in 1968 as part of the National Trails System. It is managed under the guidance the 1986 Comprehensive Management Plan for The Iditarod National Historic Trail: Seward to Nome Route, with the Secretary of the Interior designated as the federal Trail Administrator.</p> <p>The Forest Service is constructing and reconstructing the INHT through the Chugach NF to provide recreation opportunities, including within this project area (on easements across State lands). Depending on location, the INHT is “existing,” “under construction,” or “planned for construction.”</p>	<p>The Recreation and Visual Resources Study Plan was revised to consider the current and future status of the INHT within the study area.</p> <p>Multiple modifications throughout the document.</p>
82	07-02-10	USFS	p. 2	Under Goals and Objectives, the first bullet should also include the Iditarod National Historic Trail (INHT) in the list.	<p>The Recreation and Visual Resources Study Plan was revised to reflect the recommended change.</p> <p>Pg. 4 Recreation and Visual Resources Study Plan</p>
83	07-02-10	USFS	p. 2	Under Goals and Objectives the fourth bullet, last line should read "from existing and planned recreational trails and use areas."	<p>The Recreation and Visual Resources Study Plan was revised to reflect the recommended change.</p> <p>Pg. 4 Recreation and Visual Resources Study Plan</p>
84	07-02-10	USFS	p. 2	Under Goals and Objectives the seventh bullet, last line should read "...changed access to, and character	<p>The Recreation and Visual Resources Study Plan was revised to reflect the recommended change.</p>

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				of, remote area...."	Pg. 4 Recreation and Visual Resources Study Plan
85	07-02-10	USFS	p. 3, PP 1	<p>The statement that there is "no developed trailhead and minimal signing" should also state that a primary INHT trailhead is currently planned for construction near the outlet of Lower Trail Lake.</p> <p>The same paragraph describes uses as "light," "very light," and "some." These qualifiers are not based on data. The study plan should include a determination of the amount of use the area receives throughout the year. It appears that field studies are to be conducted only during July and August. This will not provide an accurate assessment of use patterns and numbers. Winter recreation use should be quantified. The possible effects to recreation users by fluctuating water levels and lake ice changes should also be studied.</p>	<p>See response to Comment 81.</p> <p>Comment noted. A winter site visit was added to the Recreation and Visual Resources Study Plan. Information gathered on winter recreation use of the area will be evaluated in the draft and final license applications.</p>
86	07-02-10	USFS	p. 3, PP2	The Forest Service will be constructing the INHT from Ptarmigan Creek to Vagt Lake in 2010 and 2011. The INHT alignment will be cleared of brush and logs from Vagt Lake north to Trail Creek in 2010. This construction project includes upgrades to the existing Vagt Lake Trail to its start near the mouth of Trail Lake. (The Vagt Lake Trail is part of the INHT.)	Comment noted. KHL looks forward to continued coordination with the Forest Service and ADNR regarding the INHT.
87	07-02-10	USFS	p.4, PP1	It should be noted that access to Grant Lake will be available via the planned INHT.	<p>The Recreation and Visual Resources Study Plan was revised to reflect the recommended change.</p> <p>Pg. 5 Recreation and Visual Resources Study Plan</p>
88	07-02-10	USFS	p. 4	In the section titled "Need for Additional Information," in the first bullet, sightseeing should be added to the list of activities.	<p>The Recreation and Visual Resources Study Plan was revised to reflect the recommended change.</p> <p>Pg. 6 Recreation and Visual Resources Study Plan</p>
89	07-02-10	USFS	p. 4	In the section titled "Need for Additional Information," it should be stated that there is a need to assess the effects on the user experience of those traveling the planned INHT.	<p>Comment noted. KHL looks forward to continued coordination with the Forest Service and ADNR regarding the INHT.</p> <p>Pg. 6 Recreation and Visual Resources Study Plan</p>
90	07-02-10	USFS	p. 6	In the section titled "Field Study Design" in the first bullet, it should read "existing and planned trails and	The Recreation and Visual Resources Study Plan was revised to reflect the recommended change.

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				access points" and "potential effects of fluctuating lake level or creek flow and project construction and operation."	Pg. 6 Recreation and Visual Resources Study Plan
91	07-02-10	USFS	p. 6	In the section titled "Field Study Design" in the third bullet, it should read "walking on existing and planned trails, and other travel ways such as the frozen lake surface."	The Recreation and Visual Resources Study Plan was revised to reflect the recommended change. Pg. 7 Recreation and Visual Resources Study Plan
92	07-02-10	USFS	p. 6	The visual assessment should also include views from the air due to the occurrence of private and commercial scenic flights in the area.	The Recreation and Visual Resources Study Plan was revised to include aerial views. Multiple modifications throughout the document.
93	07-02-10	USFS	p. 7	The section titled "Study Component #2" in the second paragraph states that visual simulation from up to four viewpoints will be provided. This number seems inadequate due to the size of the area and the variety of use areas and recreation activities identified. The number of viewpoints should be identified during the field study of recreation use of the area. Examples of viewpoints should also include those found in the eastern portion of the study area, and should include both winter and summer seasons.	The number of visual simulations is based on the extent of Project facilities, the scope and scale of the Project, and the potential views of the facilities from areas most likely frequented by potential viewers (e.g. Moose Pass, the Seward Highway, and the planned alignment of the INHT). Study Component #2 has been revised to include aerial views. Pg. 8 Recreation and Visual Resources Study Plan
94	07-06-10	NPS		As a general comment, both of these study plans [Recreation and Visual Resources and Terrestrial Resources] would benefit from clarification of the geographic boundary of the proposed study area(s). While KHL is still refining the design and location of project facilities such as roads and transmission lines, it is nonetheless possible to outline study areas for known project features. For example, project operations would result in fluctuating elevations in Grant Lake, causing impacts to the entire shoreline of the lake, including the eastern end of the lake. Therefore all plans, including the terrestrial resources study plan, should include surveys of existing conditions in this area. Likewise, the visual resources study plan should include the viewshed that could be affected by the project; generally, the area bounded by the height of land surrounding Grant Lake, to include locations south, west, and north of Moose Pass wherever new structures, roads,	The Terrestrial Resources Study Plan and the Recreation and Visual Resources Study Plan are designed to collect data regarding the potentially affected resources. Potential effects of the Project will be presented in the draft and final license applications.

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				powerlines, or the altered lake shoreline would be visible. The vicinity map provided in the draft plans lacks such details.	
95	07-06-10	NPS	p.9	<p>The schedule provided on p. 9 of the RVRDSP for completion of the study reports is wholly unreasonable. To NPS's knowledge, the Human Environment Work Group has not yet formed. KHL's deadline for written comments on the RVRDSP is today, 7/6/2010, and it will likely take the applicant and its consultants several days to analyze the comments. KHL's study designs are still quite vague, amounting to little more than a literature search with limited field reconnaissance. It is not clear if or how recreational users will be counted or interviewed, or how these subjects – including visitors from outside the area, and participants in fall, winter, or spring activities – will be chosen. Yet KHL proposes to have its study reports completed by November, just four months away. NPS does not believe this approach will provide the necessary level of detail or scientific rigor to allow FERC to make an informed decision about the likely impact of the proposed original project license on public interests, including recreational and aesthetic resources.</p> <p>For all known and potential recreational resources in the project area, including those identified below, KHL should develop specific study plans. Such plans should include sample locations, methods, timing, frequency, data analysis, and review process. NPS encourages KHL to form a "Human Environment" technical working group as soon as possible to help guide this effort, and would be an active participant. Based on the vague description of this group's formation, role and function on p.6 of the RVRDSP, it is not clear whether the work group has already been established, nor whether KHL intends to involve the group in helping develop sound recreational use study design.</p>	<p>The schedule for consultation and development of the study report has been revised. KHL will consult with agencies regarding the most efficient means of consultation during ongoing study work.</p> <p>Pg. 10 Recreation and Visual Resources Study Plan</p>
96	07-06-	NPS		Where available, KHL should use the land	The Recreation and Visual Resources Study Plan was developed

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	10			managing agencies' goals for recreational experience in the area to help inform study objectives. If such goals have not been established, KHL needs to evaluate existing recreational opportunities – not just recreational use <i>per se</i> -- and then determine, through use of ROS or similar methodology, what affect the project would have on the recreational setting. Interviews with recreational users should also be conducted in advance of developing use-specific study plans to help determine what specific experiences these users are seeking.	commensurate with the scope and scale of the Project.
97	07-06-10	NPS		The type and amount of recreational use in Alaska is highly dependent on ease of access. Easier access does not, however, make for “better” recreation. It merely alters the kind of use an area receives, and, in many cases, the kind of user attracted to the area. If the Grant Lake project is built, existing users may be displaced because the project area no longer meets their needs and preferences. When interviewing current and potential recreationists, KHL should include questions about whether the users would continue to visit the area once the access road and powerline were built, and if Grant Lake no longer supported activities like skating or skiing due to lake level fluctuations. Where would these users go instead and what impact would this displacement have on other areas?	Comment noted. KHL appreciates the recommendations for study considerations.
98	07-06-10	NPS		Likewise, depending on KHL’s proposed access policies (which should be described in the study report), new users may be attracted to the area for fishing, car-top boating, hunting, ATVing, and snow-machining. How will KHL accommodate these users? Would parking, including space for trailers, be needed?	Kenai Hydro will rely upon the relevant land management agency direction to determine recreational access to the area, and will work with agencies to develop proposed access management policies, as appropriate, for the license application.
99	07-06-10	NPS		Will any parts of the proposed project be off-limits to recreationists due to security or safety considerations? If so, how will this affect recreational opportunities and experiences? What method does KHL intend to use to implement any access limits?	The final license application and facilities proposal will describe access consistent with appropriate land management agency objectives, and any potential safety issues that are identified with the facilities proposal.

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100	07-06-10	NPS		The timing and duration of each study should be based on relevant factors. In some cases, a single season or year of data collection may not be adequate to determine existing levels of recreational use due to variability in snow cover, ice formation, salmon returns, tourism levels, barriers to access such as avalanches or major road and bridge work on the Seward Highway, etc. KHL's study plans and schedules should take this reality into consideration.	Comment noted. Relevant conditions that occur during the study will be discussed in the Recreation and Visual Resources Study Report and as part of the analysis in the draft and final license applications.
101	07-06-10	NPS		NPS is aware of the following recreational resources in the project area; however, additional types of use, including potential new uses over the term of any FERC license, doubtless exist: <ul style="list-style-type: none"> • Hiking, including backpacking • Camping • Day use • Nordic Skiing • Backcountry (metal-edge) Skiing • Skating • Mushing • Snow machining • ATVing • Hunting (Moose, goat, sheep, etc.) • Fishing (both for resident species and for salmon) • Berrying • Bird-watching • Wildlife-viewing • Boating • Sight-seeing 	Thank you for the comment.
102	07-06-10	NPS		Project facilities will affect the Iditarod National Historic Trail. Studies to assess these impacts are needed. What recreational experiences do existing and future users of this important trail resources seek? What types of recreation occur, or are likely to occur over the next 50+ years, along the trail? How would the project's facilities (road, powerline, power house, fences, gates, and security lighting) and operations (access across the INHT) affect	See response to Comment 81.

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				users' experience along this historic route?	
103	07-06-10	NPS		The project may also affect conceptual plans for the area as developed by the KPB Trails Commission, the State of Alaska, and the U.S. Forest Service. KHL should evaluate the impact of the project on these plans, which include development of local and regional trails, including a hut-to-hut route.	Consistency with existing plans will be addressed in the final license application.
104	07-06-10	NPS		NPS suggests that the visual resources section of the overall study plan be expanded to include other aesthetic impacts, such as potential changes in the natural soundscape resulting from project construction and operation. For example, there will be noise from motorized vehicles used to access project construction and operation sites, and the altered flow regime downstream of the Grant Lake weir may affect the natural sounds of the creek. The magnitude and duration of such project-related noise and changes in natural sounds should be estimated and evaluated.	Estimation and evaluation of the effects of Project construction and operation on area noise and natural sounds will be included in the draft and final license applications.
105	07-06-10	NPS		As mentioned above, the recreational resources studies need to have clear geographical boundaries. Key observation points for recreational users should help inform the geographical scope of the aesthetics study. Flight-seers should be included as recreational users. The visual effect of the "bathtub ring" around Grant Lake should be included in the impact analysis, as should any likely changes in the extent or duration of ice formation on the lake.	See response to Comments 92 and 94.
106	07-06-10	NPS		How will KHL determine which four viewpoints should be used in developing visual simulations of the project? Why four? Does KHL have criteria with which to rank the relative importance of project viewpoints? What methods (e.g. an online visual preference rating survey, focus group, interviews with existing project area users, evaluations by potential visitors) will KHL use to assess the impact of the simulated project? How will KHL capture the opinions of tourists?	The Recreation and Visual Resources Study Plan was revised to clarify the methods. Multiple modifications throughout the document.
107	07-06-10	NPS		The effect of any security lighting associated with the project on night skies should also be evaluated.	The license application will state whether any lighting is necessary with the final facilities proposal, and will consider the potential

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					effects of lighting, if any is proposed.
108	07-06-10	NPS		The project, if licensed, will affect recreation and visual resources for 30-50 years. How does KHL intend to estimate future recreational demand in the area? What methods will KHL use to assess the cumulative impact of this project and other developments on the affected area's visual and recreational resources?	The Recreation and Visual Resources Study Report and draft and final license applications will present information on recreation trends in the Project area. FERC has identified recreation resources as an area that will be included in the cumulative effects assessment in the Project EA.
109	07-06-10	NPS		Are new facilities (e.g. boat launches, parking areas, or improved trails) needed or desirable to accommodate changing recreational use in the area?	The need for new facilities will be evaluated in consultation with agencies and stakeholders based on the study results and assessment of Project effects in the draft and final license applications.
110	07-06-10	ACE	p.4	The road is of particular interest to many local residents as they know from experience the impacts roads can have on an area. On p 4 of the draft plan, are four identified areas that need further study. We would also like to see an analysis of potential impacts that could result from increased access into the area and adjacent backcountry.	See response to Comment 98, regarding agency coordination to formulate a management plan for public use of the Project access road. The impacts to resources from construction and use of the Project access road will be analyzed in the draft and final license applications.
111	07-06-10	ACE		Many of the local residents are concerned about whether the lake will be safe to ski on in the winter months as the level of the water is drawn down over the course of the winter.	Impacts to winter recreational use of Grant Lake will be discussed in the Recreation and Visual Resources Study Report and analyzed in the draft and final license applications.
112	07-06-10	ACE		Mentioned in the draft study plans is a plan to organize a Human Environment Working Group, and we encourage the proponents to follow through with their schedule as proposed.	Comment noted. KHL will consult with agencies regarding the most efficient means of consultation during ongoing study work.
113	07-06-10	ACE	PAD	Recreation-one of the region's top sectors of employment and economic development this topic needs to be evaluated in more depth by a qualified consultant who has an understanding of the intrinsic and off-site benefits of recreation. The PAD claims (p108) no adverse impacts have been identified on recreation resources, illustrating that this is an area that needs further study.	Comment noted. The Recreation and Visual Resources Study will be collecting data on recreation use in the Project area. The Recreation and Visual Resources Study Report and the draft and final license applications will evaluate Project related impacts to recreation resources.
114	07-06-10	ACE	PAD	Motorized vs. non-motorized – what happens to the value of recreational lands when access by motorized vehicles is introduced? What additional maintenance and enforcement will be needed with the introduction of new roads? What precautions will be taken to minimize poaching, litter, fire,	Access management needs will be evaluated in consultation with agencies and stakeholders based on the resource goals of the land management agencies.

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				illegal camping, invasive species, erosion? Current levels of law-enforcement by the Forest Service is insufficient to prevent degradation of wetlands, forested areas, and even alpine habitats (sheep and mountain goat habitat in the Falls Creek drainage, as one example) on the Chugach National Forest due to unauthorized ATV use.	
115	07-06-10	ACE	PAD	Carrying capacity-how many more people, and what type of uses will occur in the area if access is improved?	Access management needs will be evaluated in consultation with agencies and stakeholders based on the resource goals of the land management agencies.
116	07-06-10	ACE	PAD	Tourism- what do people who visit the area do now? What draws them here? How might this change with increased development in the area? The PAD implies that activities such as scuba diving occur in the area. Obviously the information needs some refinement and updating.	See response to Comment 113.
117	07-06-10	ACE	PAD	Community Quality of Life Values-what do people most appreciate about living/working/playing in the area?	See response to Comment 113.
Cultural Resources Draft Study Plan					
118	07-02-10	USFS		The methodology and consultation process for cultural resources defined in the draft study plan is acceptable. However, the figure displayed on page 11 should reflect the current, updated map. The Area of Potential Effect (APE) needs to be adjusted to accurately encompass the proposed project facilities and access roads. The cultural resources and surveys listed in the tables on Pages 4 and 5 may also need to be modified.	Comment noted. The Cultural Resources Study Plan will be revised to include updated information and maps of Project facilities. The APE will be adjusted as necessary.
119	07-01-10	RBCA	p.7	RBCA believes the APE as proposed is too narrowly defined... We believe that the vertical measurement is appropriate but the horizontal measurement should be increased to 100 feet. Additionally, all structures, turnarounds, transmission corridors, pipelines corridors, dam sites, surge tank, power plant, staging areas, fill areas, pullouts, appurtenant facilities and road alignments should be specified and located. All known site areas including current and formerly	Consultation for Section 106, including the appropriate extent of the APE will continue. Recommendations of the consulting parties will be incorporated into a revised APE. The schedule for consultation and completing the resource studies was revised.

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				used trails should be included in the APE and the 100 foot measurement extended beyond those site area boundaries. The APE should include all the small alluvial fans that drain into Grant Lake. These areas may have offered usable space to earlier inhabitants.	
120	07-01-10	RBCA		KHL has not committed to a road corridor nor transmission line type (which would affect corridor width). Three route alignments have been proposed. Defining an APE without a KHL commitment to infrastructure locations creates inefficiency and introduces the possibility of error. Until an APE is defined, KHL should consider surveying a larger study area that would include the area north of Falls Creek to Grant Creek.	KHL filed with FERC a revised project description and facilities figure on August 13, 2010. This description was also considered in FERC's Scoping Document 2. KHL will continue consultation with appropriate agencies regarding the road alignment and facilities location. An updated facilities description and figure will be included in all study plans.
121	07-01-10	RBCA		The reported (Ebasco study page 4-8) trail between site SEW-285 (Solars Sawmill) should be relocated and surveyed.	Potential Project mitigation activities will be assessed relative to the final proposed Project presented in the draft and final license application.
122	07-01-10	RBCA	Methodology	Typically, all artifacts uncovered in shovel tests or test units are collected and curated. We think that should occur with this study as well.	Comment noted. Study methods will comply with current standards and practice. The Cultural Resources Study Plan will be revised to clarify methodology.
123	07-01-10	RBCA	Methodology	Because the vegetation along the shoreline is dense and choked with beetle-killed fallen spruce, walking is difficult but not impossible. We think that in addition to a pedestrian reconnaissance of the shoreline within the APE, the entire shore should be surveyed by boat.	See response to Comment 122.
124	07-01-10	RBCA	Methodology	Should construction of the Grant Lake dam occur and the lake level reduced, KHL should inventory newly exposed shoreline for cultural artifacts and features, especially, but not limited to, near known historic sites. Water bodies provide an attractive place to dispose of trash historically and currently.	See response to Comment 122. The Historic Properties Management Plan required for the Project will provide guidance for handling exposure of cultural artifacts during Project construction and operation.
125	07-01-10	RBCA		We'd like to reiterate comments made by Judy Bittner, Alaska State Historic Preservation Officer at the HDR-sponsored cultural meeting in Anchorage on June 24, 2010. She emphasized that the Iditarod National Historic Trail is of <i>national</i> importance, not just important locally or regionally. She also mentioned the need to consider the Iditarod trail in	Comment noted.

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				the context of a recreational resource and as a cultural resource.	
126	07-01-10	RBCA		Do not rely on existing cultural resource inventories. The USFS studies focused on selected areas in conjunction with proposed prescribed burning. The EBASCO study didn't address the shoreline of Grant Lake. Plus in the 26 years since the EBASCO study was conducted, sites have deteriorated. For example, the cabin standing at SEL-285 in 1984 has collapsed.	Comment noted.
127	07-01-10	RBCA		Because the rising lake levels will have an adverse effect on cultural resources, KHL should begin planning immediately on how to address the impact.	If inundation will occur based on the final Project proposal, potential effects of this inundation, and any proposed mitigation, will be presented in the draft and final license applications.
128	07-01-10	RBCA		<p>Excavation RBCA suggests KHL assess the threat to the stability of the log cabin at SEL-659 by higher water levels and if necessary develop a mitigation program.</p> <p>Intact subsurface deposits exist within the 10 foot level at SEL-659. Because the site area is large (approximately an acre) and located at the shoreline, it is reasonable to expect that this deposit is extensive horizontally, potentially as much as 200 feet. Intact subsurface deposits exist at SEL-285 though they appear to be much less extensive than at SEL-659. KHL should be aware of the cost and complexity of site excavation in its study plans and budgeting for the proposals. We suggest planning on a 100% excavation (see RBCA comments on the KHL Pre-Application Document) of the portions of the site directly impacted by rising water levels (Grant Lake elevation plus 10 feet vertical).</p> <p>Increased access to Grant Lake and other known and not yet discovered sites within the APE will subject them to the threat of vandalism. KHL should assess the threat of vandalism and develop a plan for mitigation.</p>	If inundation will occur based on the final Project proposal, potential effects of this inundation, and any proposed mitigation, will be presented in the draft and final license applications.
129	07-01-	RBCA	Table 2, page	Solars Sawmill is misidentified as SEW-00258. It's	Comment noted. The Cultural Resources Study Plan was revised as

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	10		5	actually SEW-00285. The site has not been determined not eligible as indicated.	necessary.
130	07-01-10	RBCA	Page 5	We noticed that SEW-155 (Brosius cabin) was not included in the tables.	Comment noted. The Cultural Resources Study Plan was revised as necessary.
131	07-01-10	RBCA		Other sites nears Falls Creek should be included in the study plan.	Comment noted.
132	07-01-10	RBCA	Page 5	The Carter Lake trail is misidentified as being within one mile of the proposed APE.	Comment noted. The Cultural Resources Study Plan was revised as necessary. Pg. 6 Cultural Resources Study Plan
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133	7-9-10	USACOE	Erosion Study Component	This study plan indicates that an erosion study will be done on the shores of Grant Lake to determine how raising the elevation of the water would affect shore erosion and we support this analysis. However, no mention is made of studying the effects of the dam and altered flow on aspects of Grant Creek other than the potential effect to fishes. In order to fully address the effect of the potential fill, we must also know the anticipated effects of the project on Grant Creek. How would the change in current patterns and water circulation alter or erode the physical substrate, not just the suitable spawning habitat, of Grant Creek? In addition, how would the proposed project affect sediment transport and deposition in both the lake and the stream?	Comment noted. The qualitative erosion study initially proposed for Grant Creek will be replaced with a program that includes quantitative sediment sampling and modeling of sediment availability and transport. The license application will analyze potential effects on both Grant Creek and Grant Lake substrate commensurate with the scope of the Project.
134	07-02-10	USFS	p.3	A reference identified in the Aquatic Resources Draft Study Plan (Source: Grant Lake Morphology in Marcuson, P. 1989. Coho Salmon Fry Stocking in Grant Lake, Alaska, USDA Forest Service, Seward Ranger District, Chugach National Forest, February 1989) states: “An upper basin of Grant Lake has a maximum depth of 80 feet and a lower, outlet end exceeding 90 feet in depth. The two basins are separated by a narrow isthmus with an island and less than 10 feet of depth.” Lake depths in the area in question should be evaluated and this statement verified. If true, there	The maximum drawdown of the lake as currently designed will be to an elevation of 687 feet, whereas the elevation of the isthmus between the basins is at elevation 685 per the existing bathymetry. Consequently, there should be no disproportionate drawdown. These depths will be confirmed during pre-licensing field work, and any potential effects will be discussed in the final license application.

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				could be a disproportionate drawdown of the lower basin and there may be a need to dredge between, or otherwise connect, deeper regions of the upper and lower portions of Grant Lake.	
135	07-02-10	USFS	Figure 1	Please note that the draft study plan should display the updated project map.	Comment noted.
136	07-06-10	USFWS		USFWS recommends developing SMART objectives with statistical criteria, sampling design, and methods that will provide quantitative estimates for the impact of Project construction and operation on water quality, hydrology, and ice conditions of Lower Trail Lake and Trail Creek. (See USFWS comment letter p. 8 for full detail of comment.)	The intent of the study plans is to provide information commensurate with the scope of the proposed Grant Lake Project. While KHL questions whether the SMART system of developing objectives is fully applicable to all the required studies for the Grant Lake Project, revised plans provide additional definition of objectives. The study plans were modified to include a hierarchical discussion of objectives that includes overall project objectives, specific study objectives, and statistical objectives with emphasis on hypothesis testing where applicable.
137	07-06-10	USFWS	Erosion Study	The Grant Lake shoreline erosion study and Grant Creek substrate recruitment studies would both benefit from SMART objectives. As currently proposed, both studies will result in qualitative assessments that will be open to interpretation.	See response to Comment 136.
138	07-06-10	USFWS		USFWS recommends targeting data collection to adequately describe coho salmon spawning habitat and suitability criteria. Coho salmon likely spawn in Grant Creek as late as November, which may coincide with increase stream flows during project operations in future years. Adequately describing adult coho salmon spawning habitat is necessary as baseline data to evaluate potential Project impacts and cumulative effects.	Determination of numbers, spawning locations, and suitability criteria was included in the Aquatic Resources Study Plan.
139	07-06-10	USFWS		USFWS recommends describing flow conditions at transects during winter months. (See USFWS comment letter p. 9 for full detail of comment.)	The winter study program was expanded to include Instream Flow transects.
140	07-06-10	ADFG	Goals and Objectives	As with the Aquatic Resources Draft Plan, we recommend that the objectives are revised to be more specific and repeatable. Objectives need to be specific in terms of what parameters are being estimated and when relevant, under what criteria for accuracy and precision. The overall goal is to	See response to Comment 136.

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				<p>estimate how proposed operation scenarios will alter hydrologic, thermal and chemical regimes and how these alterations will influence the maintenance of fish habitat.</p> <p>Flowing water has been referred to as the “master” variable that drives the creation and maintenance of aquatic and riparian habitats. Reductions in flow and flow variability have predictable, albeit general, consequences. Reductions in flow reduce the availability of aquatic habitat and reductions in flow variability impair a streams competence to maintain habitat. Stabilization of the flow regime typically results in coarser substrates, channel incision and reduced lateral hydrologic connectivity. Since the lateral margins and off-channel areas of streams are important for spawning and rearing, reductions in lateral hydrologic connectivity can result in substantial reductions in biological productivity.</p>	<p>Comment noted. See Instream Flow Study Component of the Aquatic Resources Study Plan.</p>
141	07-06-10	ADFG	4.2.1	<p>We support the general approach for the collection of water quality and continuous temperature data. We recommend, however, the installation of an additional continuous temperature data logger in the off-channel environment. In addition, and as stated above, we also recommend the collection of instantaneous field measurements throughout the full range of meso habitats identified in the Aquatic Resources study.</p>	<p>Continuous temperature data loggers will be added at selected off-channel locations. Instantaneous temperature measurements have been and will continue to be collected at meso habitat locations. See Instream Flow Study Component of the Aquatic Resources Study Plan.</p>
142	07-06-10	ADFG	4.2.2	<p>One stream gage is proposed near the historic USGS gage location. This should be sufficient provided that additional field measurements of discharge are made at various locations along Grant Creek. We recommend periodically taking synoptic discharge measurements at the outlet of Grant Lake, near the outlet of the canyon, and downstream of the gage to assess accretion due to tributaries and/or interactions between ground and surface water. Accretion in the canyon reach, if present, will be important to consider when evaluating instream flow needs in the proposed bypass reach. Accretion below the proposed powerhouse location will be important</p>	<p>Meaningful accretion estimates will be very difficult to measure in Grant Creek because small differences will be masked by measurement errors. Nevertheless, an accretion study at low flow using either salt dilution or direct measurement techniques has been added to the study program.</p>

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				<p>when evaluating proposed releases from the powerhouse.</p> <p>In support of the development of hydrologic records at the proposed stream gage, we recommend conducting more than three discharge measurements. A sound stage-discharge rating typically requires more than three measurements. We also recommend conducting measurements in early April to measure base flow conditions and throughout the summer and fall. The data from the stream gage should also be frequently downloaded to ensure that it is still working properly and replaced if necessary.</p>	<p>Comment noted. Combined discharge measurements between the hydrology and instream flow study programs will provide an adequate number of measurements at a variety of flows.</p>
143	07-06-10	ADFG	4.2.3	<p>More specificity is needed for these studies. Procedures used to evaluate sediment transport and erosion should be described. We also recommend using the hydrologic record to estimate the magnitude, timing and duration of flows needed to transport sediments and maintain downstream fish habitat. High flows are also needed to maintain off-channel habitat and provide seasonal access to these habitats.</p>	<p>The qualitative study initially proposed for Grant Creek was replaced with a program that includes quantitative sediment sampling and modeling of sediment availability and transport. Methods to be used in the Grant Lake Shoreline Erosion Study have been clarified.</p> <p>Pg. 14 Water Resources Study Plan</p>
144	06-04-10	KWF	PAD	<p>The PAD for water resources and aquatic resources are insufficient to provide meaningful comment.</p> <p>The premise of the proposed studies as described in the PAD are to gather baseline data, not to address impacts from potential hydro development scenarios. Gathering baseline data is not adequate in this context. It is unclear what the scope of the hydro-development project is. The range of publicly stated options by the applicant Kenai Hydro has been very wide, the scope must be narrowed to provide more meaningful comment on specific studies necessary.</p>	<p>The intent of the PAD was to report existing information. Where information gaps exist, or more recent information is necessary for evaluation of Project effects, the water resources and aquatic resources study reports will provide additional information regarding existing resources in the Project area.</p>
145	06-04-10	KWF	PAD	<p>Hydrologic Data Records</p> <p>The period of record for all aspects of hydrological data is both too historic and of insufficient duration to support any assumptions or predication that are flow dependent. Statistical measures of hydrology</p>	<p>Very few Alaska projects are accompanied by a hydrological record that is sufficient for optimal statistical analysis. The combination of historic and current hydrological measurements will provide a reasonable framework for engineering and environmental analysis. Limitations of the data will be discussed in the study reports and in</p>

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				<p>play a key role in every aspect of modeling and predicting impacts from altering natural flow regimes. Statistically valid flow frequencies and temporal rates-of-change will not be available with the proposed studies, a longer and more modern record is required.</p>	<p>the license application documents. Ongoing hydrological monitoring including post-construction will extend the record and allow project adjustments if needed.</p>
146	06-04-10	KWF	PAD	<p>Sediment Transport The relationship between flow regimes and sediment transport is a well-developed, complex science. A wide range of numerical models are available; however the PAD suggests studies related to sediment transport will be limited to a qualitative 2-day field observations and reported in the form of a “memo”. Given the relative importance of the role sediment has on economically important species this approach seems woefully inadequate.</p> <p>The ability to model 2-D varied unsteady flow with realistic and statically valid flow data, coupled with existing sediment transport models that have been calibrated to the existing conditions should be available for analysis. Any sediment transport model used should be calibrated to empirical data representative of the existing condition; with simulations under the full range of proposed modifications AND full range of uncertainties should be produced. The suggested modeling exercise should also include predictions of catastrophic impoundment failure.</p> <p>Recruitment of stream substrate, woody debris and other detritus are fundamental components of the physical environment and appear to be absent from either basic monitoring or study plans. Detailed bulk grain-size analysis of sufficient sample size to characterize the sediment distribution from both the active bed and sub-active layer are required to evaluate predicted changes to stream-bed over the engineered design life. Wolman pebble counts or similar methods are insufficient to characterize grain-size distributions.</p>	<p>See response to Comment 143.</p>

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				Sediment data derived from bulk samples should be collected in multiple reaches, as the stream is recognized to have segments that are in equilibrium with the available sediment, as well as reaches of erosion and deposition. It is not possible to offer valid predictions on how the substrate will respond without quantifying the existing substrate. This should include, but not be limited to the discharge required to maintain channel form in each segment; flooding frequencies and flows required to mobilize bed material should be available as well as the range of flow required to recruit and transport the full distribution of bed sediment. Each of these sediment concerns must be related to stream biota downstream of impoundment and delineated through the entire downstream zone of influence, including Trail Lake.	
147	06-04-10	KWF	PAD	Implication of altered thermal regimes: No information is planned to evaluate the altered temperatures in the context of the relationship to existing food at the time of organism emergence. While temperature concern is recognized in the studies, the implications of altering the emergence of aquatic life is not addressed. The relationship between aquatic life in Grant Creek and Trail Lake is not mentioned, and may be significant. That is, how are available food resources linked to emergence timing, are sufficient food resources available if emergence times are altered? Will there be increased competition for food resources?	The draft and final license applications will assess the impact of changes to temperature regimes (if any) on emergence timing and discuss potential impacts to fish.
148	07-06-10	ACE	PAD	Identify cumulative impacts to the watershed-there is currently no discussion of this in the PAD.	Scoping Document 2 identified resource issues that will be analyzed for cumulative effects in the final environmental documents.
149	07-06-10	ACE	PAD	Climate change-there should be some discussion about how water flows will change as a result of climate change. Bradley Lake is already suffering from a lack of water leading to diminished energy production. What will happen to Grant Lake in 30 or 50 years?	FERC noted in its Scoping Document 2 that predictions of future flow scenarios on any given stream would be too speculative given the state of the science [on climate change] at this time. However, we do suggest that when making flow recommendations and conditions, agencies consider whether different requirements for high and low water years are appropriate.
150	07-06-10	M. Cooney	PAD/Study Plan	As a show of good faith to project area residents and to demonstrate a strong commitment to environmental stewardship and protection, the	KHL will obtain all necessary state and federal permits to operate the Project. KHL does not control the policy of Alaska DEC regarding Clean Water Act Section 401 water quality certification.

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				applicant (HEA) should voluntarily seek formal water quality (Section 404, Clean Water Act) certification for the project though certification is not currently required by Alaska DEC for hydropower projects in Alaska.	
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151	07-06-10	USFWS	Goals and Objectives	Specific objectives should be developed for each study component with a clearly specified level of precision and accuracy such that the objectives are statistically sound. USFWS recommends SMART objectives with statistical criteria, sampling design, and methods to provide quantitative estimates of potential project impacts identified for study. (See USFWS comment letter p. 3-4 for full detail of comment.)	See response to Comment 136.
152	07-06-10	USFWS	Salmon Spawning Distribution and Abundance	A fish counting weir would provide better estimates. An objective was identified in the 2009 Draft Aquatic Biology Baseline Study Plan to conduct a feasibility study for siting and installation of a counting weir...Was this feasibility study completed? If so, what was the outcome? (See USFWS comment letter p. 4-5 for full detail of comment.)	Assessment of stream conditions in 2009 and 2010, in conjunction with evaluation of recently developed floating weir technology, suggest that a weir is feasible. The Aquatic Resources Study Plan was modified to include the use of a weir, possibly in combination with a video counting system, to enumerate salmon and rainbow trout, provide capture for telemetry studies, provide insight into stream life, and calibrate foot surveys. Multiple modifications throughout the document. Primary weir discussion begins on Pg. 12
153	07-06-10	USFWS	Salmon Spawning Distribution and Abundance	A SMART objective with statistical criteria could help guide sampling designs and methods to estimate abundance and spawning distribution of adult salmon in Grant Creek...a single estimate for observer efficiency for all counts is likely not appropriate because stream and observation conditions can be variable over the course of a spawning season. (See USFWS comment letter p. 5 for full detail of comment.)	See response to Comment 136. Methods for refining observer efficiency estimates are described in the Final Aquatic Resources Study Plan Multiple locations throughout the document
154	07-06-10	USFWS	Salmon Spawning Distribution and Abundance	Regardless of the method selected, counts need to be continued through November to estimate numbers of adult coho salmon returning to Grant Creek. The only information for coho salmon collected to date in Grant Creek includes juvenile numbers and a small number of adults counted during the last	Comment noted. The existing study plan specifies that counts will continue through November.

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				walking survey in late September 2009. Coho salmon spawning abundance, distribution, and timing are key baseline population parameters that are necessary to evaluate potential Project impacts and cumulative effects.	
155	07-06-10	USFWS	Salmon Spawning Distribution and Abundance	Develop SMART objectives with statistical criteria, sampling design, and methods to assess spawning distribution in Reach 5 for all salmon species, not just Chinook salmon. (See USFWS comment letter p. 6 for full detail of comment.)	See response to Comment 136.
156	07-06-10	USFWS	Resident and Rearing Fish Distribution and Abundance	Minimize sampling effects on spawning fish during this critical and vulnerable time of their life history. Develop rigorous sampling protocol to address CPUE differences. (See USFWS comment letter p. 6 for full detail of comment.)	The Aquatic Resources Study Plan was modified to include sampling protocols in the vicinity of spawning fish. Pg. 22 Aquatic Resources Study Plan
157	07-06-10	USFWS	Resident and Rearing Fish Distribution and Abundance	Based on results of juvenile sampling in 2009, it appears that Dolly Varden are an important component of the fish assemblage in Grant Creek, yet little is known about their life history or habitat use in Grant Creek, particularly of adults. We therefore recommend investigations that describe the basic life history and habitat use of Dolly Varden in Grant Creek that includes estimates of spawning abundance and distribution and estimates of seasonal habitat use and migration patterns. (See USFWS comment letter p. 6 for full detail of comment.)	The Aquatic Resources Study Plan was modified to include expanded sampling during the late fall spawning period and during the winter to provide a more complete picture. Multiple locations throughout the document.
158	07-06-10	USFWS	Resident and Rearing Fish Distribution and Abundance	Develop SMART criteria to describe the migratory patterns of rainbow trout and Dolly Varden throughout the Kenai River watershed as baseline data. (See USFWS comment letter p. 6-7 for full detail of comment.)	See response to Comment 136.
159	07-06-10	USFWS	Resident and Rearing Fish Distribution and Abundance	Round whitefish and Arctic grayling have been caught during angling surveys in Grant Creek and an assumption was made (page 5) that these species do not spawn in Grant Creek. We request additional information to justify this conclusion.	The suggestion of no spawning by grayling and whitefish was a conclusion drawn by earlier investigators. There is no assumption on the part of the current study team. However, ongoing and historical studies have indicated that these two species are so rare that targeted sampling would not be justified. Opportunistic observations of these species will continue to be made as part of general sampling programs and information updated as it becomes available.

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160	07-06-10	USFWS	Resident and Rearing Fish Distribution and Abundance	Basic life history investigations should be completed to address a series of baseline data questions. (See USFWS comment letter p. 7-8 for full detail of comment.)	The Aquatic Resources Study Plan was revised to reflect more clearly data to be collected. The license application will use these data to evaluate potential Project effects.
161	07-06-10	USFWS	Resident and Rearing Fish Distribution and Abundance	Develop SMART criteria to investigate overwinter survival and the availability of suitable overwinter habitat ... The information is necessary as baseline data to evaluate potential Project impacts and cumulative effects. [Additional methods such as PIT tags and mark-recapture are suggested.] (See USFWS comment letter p. 7 for full detail of comment.)	See response to Comment 136. A statistically supportable overwinter survival study would be difficult to conduct and is beyond the scope of the Grant Lake Project. However, the addition of a smolt outmigration study with spring sampling will provide direct evidence of juvenile fish production and overwinter stream use.
162	07-06-10	USFWS	Habitat Mapping and Critical Factors Analysis	USFWS 21: USFWS recommends that Habitat Availability and Habitat Utilization studies be conducted during winter so that results of the Instream Flow Analysis will also be applicable during winter.	The winter study program was expanded to include habitat utilization at the instream flow transects. Pg. 19 Aquatic Resources Study Plan
163	07-06-10	USFWS	Habitat Mapping and Critical Factors Analysis	USFWS 22: We recommend presenting a table or other analysis using information available in the peer-reviewed literature that models emergence timing of Chinook salmon, coho salmon, sockeye salmon, rainbow trout, and Dolly Varden based on changes in water temperature from current incubation temperature regimes.	The environmental analysis included in the draft and final license applications will include such an analysis based on the integration of study results and available models.
164	07-06-10	USFWS	Habitat Mapping and Critical Factors Analysis	USFWS 23: We recommend adding temperature as a "Habitat use Parameter" for "rainbow trout spawning" in Table 2 on Page 23 because it is likely an environmental cue that influences the onset of spawning for rainbow trout in Grant Creek.	Temperature was added to Table 2.
165	07-06-10	ADFG	Goals and Objectives	In general, we recommend that the objectives are revised to be more specific and repeatable. Objectives need to be specific in terms of what parameters are being estimated and when relevant, under what criteria for accuracy and precision.	The general goals expressed at the beginnings of the study plans were intended to be consistent with those expressed in the PAD and to conform to the requirements of the FERC application process. The objectives of specific study elements are explained more fully and made more specific. See response to Comment 136.
166	07-06-10	ADFG	Goals and Objectives	Impact of project operation on sediment transport. Comment: such an assessment would require an estimate of the particle size distribution of the surface layer of the stream bed, an estimate of flows needed to mobilize this distribution and the flow	See response to Comment 165.

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				duration of these flows based on the historic period of record. We recommend restructuring this statement into an objective statement that specifically addresses the estimation of these physical parameters.	
167	07-06-10	ADFG	Goals and Objectives	<p>Impact of project operation (in terms of hydrologic regulation) on fish abundance and distribution. Comment: this statement requires more specificity and several prerequisite objectives. To assess impacts to the distributions of fish, the distributions of habitats utilized by fish must first be assessed, followed by quantitative assessments of fish habitat utilization. These should be two separate objectives. The relationships between utilized habitats and the natural flow regime must then be modeled to estimate instream flow needs to support existing fish habitat utilization patterns and comparison with alternative operation scenarios.</p> <p>We recommend framing a separate objective to estimate the impacts of hydrologic regulation on fish abundance and question whether or not estimations of abundance can be used to assess impacts associated with hydrologic alteration resulting from the proposed project. Specifically, we question whether or not adequate levels of accuracy and precision for population estimates can be met to attribute any changes in populations to hydrologic alteration associated with the proposed project. We agree that there is value in enumerating populations of fish and putting those populations in the context of the Kenai watershed, but we question whether these estimates with their associated variability and uncertainties, can be used to measure changes in fish populations with sufficient accuracy and precision. These estimates, when put in a watershed context, can be useful in a comparative analysis and possibly for future mitigation analysis, if needed. At this point, however, our focus will be on the avoidance of impacts to fish habitat.</p>	Comment noted. See response to Comment 165.

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168	07-06-10	ADFG	Goals and Objectives	Impact of project construction and operation on biological productivity and abundance of fish food organisms in Grant Creek. Comment: impacts resulting from project construction should be quantified in terms of the total amount of habitat lost or converted to project infrastructure. Objectives for estimating biological production and the abundance of fish food organisms need to be specific in terms of what parameters are being estimated.	Comment noted. See response to Comment 165.
169	07-06-10	ADFG	Goals and Objectives	Impact of project construction on fish habitat in Grant Creek. Comment: we recommend quantifying the total amount of fish habitat displaced or converted by project infrastructure.	Comment noted. See response to Comment 165.
170	07-06-10	ADFG	Need for Additional Information	2009 field studies provide a good foundation for this summer's studies but were more reconnaissance and qualitative in nature. Results of 2009 fisheries investigations are primarily reported by study reaches of the stream that are more for reference purposes. The results were also more qualitative in nature. In 2010, specific habitat attributes and fish habitat utilization patterns need to be quantified for each of these reaches so that instream flow needs can be assessed. The following list of information needs is listed in the 2010 aquatic resources draft study plan. We briefly provide our comments following each identified need and address each need in greater detail in the following respective sections. In general, we also recommend that specific and repeatable objectives are framed for each of the following data needs.	See responses to following Comments 171 through 179. See response to Comment 127.
171	07-06-10	ADFG	Need for Additional Information	Determine juvenile fish use of winter habitats. Comment: we recommend that smolt trapping be conducted in addition to winter surveys. Although we are supportive of winter surveys, it is unknown whether or not they will be feasible. Smolt trapping in the fall and then again in spring is recommended to estimate the timing of outmigration and provide a better understanding of the rearing ecology of juvenile salmon in Grant Creek.	The Aquatic Resources Study Plan was modified to include smolt trapping in spring and fall. Pg. 19 Aquatic Resources Study Plan
172	07-06-10	ADFG	Need for Additional	Better define fish use of microhabitats and overall species composition and relative abundances in	The Aquatic Resources Study Plan includes a habitat mapping component where all meso habitats will be identified. Within that

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			Information	reaches 1-4. Comment: we recommend a hierarchical approach to surveys and characterizations of aquatic habitat. The 2010 study plan switches between different spatial scales at which habitats are studied and referred to. We recommend a more thorough definition of meso habitats prior to definition of micro habitats. Similarly, we recommend greater detail and definitions for the habitat classification study. As with the 2009 studies, the USFS Tiered Habitat Survey 1 could be referred to for structuring the stratification and surveys of each stratum.	framework, important subcategories will be identified as appropriate for the conditions in Grant Creek. The Study Plan was clarified to include better definition of habitat types and classifications.
173	07-06-10	ADFG	Need for Additional Information	Determine the extent of rainbow trout spawning in Grant Creek. Comment: we assume this means the extent of the spatial distribution of rainbow trout spawning. If possible, we recommend telemetry for this purpose since access into the canyon reach (reach 5) is difficult and hook and line surveys may provide limited information, especially if rainbow trout are only using these upstream reaches for short periods of time.	The Aquatic Resources Study Plan was modified to include a telemetry component for rainbow trout. Pg. 17 Aquatic Resources Study Plan
174	07-06-10	ADFG	Need for Additional Information	Determine use of reach 5 by juvenile and adult fish, with additional emphasis on spawning Chinook salmon use. Comment: We recommend the use of telemetry to assess the upstream distribution of sockeye as is proposed for Chinook. Sockeye are probably just as likely, if not more likely to utilize this reach for spawning.	The Aquatic Resources Study Plan was modified to include the use of telemetry to assess the distribution of sockeye salmon. Pg. 15 Aquatic Resources Study Plan
175	07-06-10	ADFG	Need for Additional Information	Delineate aquatic habitats available in Grant Creek. Identify key habitats for fish and describe and distinguish the factors that may influence fish use of the key habitats over those habitat units not occupied by fish in Grant Creek. Comment: This objective requires more specificity. We recommend characterizing meso habitats, as mentioned in #2 above, and then taking specific micro habitat measurements within the most heavily selected meso habitat units and within those that are relatively unselected. Appropriate statistical methods will be required to identify which micro habitat parameters are influential to site selection if	The Aquatic Resources Study Plan was modified to include greater specificity for this objective. Multiple locations throughout the document

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				micro habitat parameters are to be used when modeling instream flow needs.	
176	07-06-10	ADFG	Need for Additional Information	Provide an estimate of salmon spawning escapement in Grant Creek. Comment: we recommend maintaining consistency with the 2009 methods and that assumptions used for the Area Under the Curve (AUC) method be tested with site specific observations of stream life and observer efficiency.	The Aquatic Resources Study Plan includes provisions for testing the assumptions used for the 2009 escapement estimates. See response to Comment 152.
177	07-06-10	ADFG	Need for Additional Information	Examine how important individual habitat units may be affected by changes in flow due to the operation of the proposed project using instream flow assessment methods. Comment: we recommend more specificity for this need/objective. We need quantitative estimates of how hydrologic connectivity with meso habitats and important micro habitat parameters change as a function of flow in Grant Creek.	The Aquatic Resources Study Plan specifically addresses this information need. Nevertheless, the greater specificity for this objective was provided in the study plan. Multiple locations throughout Section 4.7
178	07-06-10	ADFG	Need for Additional Information	Collect benthic macroinvertebrates in Grant Creek to establish baseline diversity and abundance characteristics. Comment: this need/objective requires more specificity with respect to spatial scale how abundance will be quantified. We recommend estimating the relative density for each genus by habitat type. We also recommend providing these estimates for each meso habitat instead of leaving this unspecified.	The Water Resources Study Plan was modified to include greater specificity for this objective. The existing study plan is focused on providing a statistically valid baseline of relative productivity that can be compared from year to year. Duplicate sampling within uniform riffle habitats using approved methods is the commonly accepted methodology.
179	07-06-10	ADFG	Need for Additional Information	Collect periphyton samples in conjunction with macroinvertebrate samples in Grant Creek to establish baseline chlorophyll a availability. Comment: as with macroinvertebrates we recommend that these samples are stratified by meso habitats.	See response to Comment 178.
180	07-06-10	ADFG	Section 3.2.1	We support the continuation of ground surveys to assess the distribution and abundance of spawning salmon in Grant Creek but feel that telemetry or aerial surveys will most likely be needed to fully assess the distribution of spawning into the canyon reach (reach 5). We also recommend that surveys are performed frequently enough to account for stream life (the length of time fish are alive and	The Aquatic Resources Study Plan was revised to include a telemetry study of rainbow trout. See response to Comment 174 relative to sockeye telemetry. Pg. 17 Aquatic Resources Study Plan The frequency of ground surveys will be reviewed in light of existing data to determine whether more frequent observations

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				<p>spawning in Grant Creek) of species being observed. As proposed, the frequency of surveys would be every 10 days. When conducting ground surveys and estimating populations using the AUC method, stream life and observer efficiency must be accurately estimated. If stream life is not greater than 10 days, population estimates will be underestimated. We support the use of telemetry to estimate the distribution of adult Chinook in Grant Creek and encourage the use of this method for adult sockeye and rainbow trout. Since fixed repeating stations are being installed to support the use of telemetry to estimate the distribution of Chinook it seems like a missed opportunity to not utilize this existing instrumentation to estimate the distributions of other species. For sockeye, we recommend spreading out the implantation of radio tags throughout the sockeye run to account for any life history differences that sockeye in the canyon reach may have. We recommend consultation with agencies on the number of radios that would be needed to assess adult sockeye distribution. This same recommendation applies to the objective of assessing the distribution of rainbow trout. It is important to know which species of fish are distributed within reach 5 since it is the proposed bypass reach and instream flow releases will depend upon the species that are present and the timing of their presence.</p>	<p>would be appropriate. Additionally, aerial surveys will be considered, and may be proposed to accompany at least some of the ground surveys with emphasis on Reach 5.</p> <p>Comment noted.</p>
181	07-06-10	ADFG	3.2.2.1	<p>In 2009, the use of angling to estimate catch-per-unit-effort was not successfully used to obtain a sufficient number of recaptures to allow population estimates for rainbow trout. Instead of continuing this approach in the future, we recommend putting resources into a rainbow trout telemetry study so that the full spawning and rearing distribution of this species can be estimated. This will also prevent the need to conduct angling surveys in the canyon reach which will be restricted by access and implemented with unknown effectiveness.</p>	<p>The Aquatic Resources Study Plan was modified to include a telemetry program for rainbow trout.</p> <p>Pg. 17 Aquatic Resources Study Plan</p>
182	07-06-	ADFG	3.2.2.3	<p>We support the proposed efforts to document rearing</p>	<p>See response to Comment 171.</p>

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	10			of anadromous and resident fish in winter but are concerned that opportunistic minnow trapping and electro-fishing will not adequate to document the winter ecology and life history of rearing fish. We support these efforts, but recommend trapping smolts in the fall and spring to estimate when fish emigrate from Grant Creek. If the majority of smolts are trapped in fall, rearing is likely limited in winter. This would certainly be supported by the presence of young of year fish and the lack of juvenile salmon in Grant Creek. Understanding the life history of rearing fish in Grant Creek is needed to assess instream flow needs for rearing on a seasonal basis.	
183	07-06-10	ADFG	3.2.2.4	In general, we support the procedures and gear types proposed to assess resident and rearing fish use of open-open water habitats. We recommend electro-fishing of young of year and juvenile fish, in compliance with collection permits, to allow more accurate identification of habitat associations and to quantify utilization, or the relative density of fish by specific meso habitats. We recognize that there are issues with deeper water and the presence of adult fish when using this gear type, but recommend its use in shallow off-channel habitats and habitats providing lateral refugia for young of year and young rearing fish. In many of these habitats, electro-fishing is the only viable method to sample fish and assess habitat utilization.	Comment is noted. Electrofishing will be employed as appropriate.
184	07-06-10	ADFG	3.2.3	Sampling and assessments of fish habitat utilization needs to be stratified by habitat. The delineation of meso habitats needs to be diversified. Several important meso habitats are not readily apparent in 2009 classification, which may result in their exclusion and unrepresentative flow-habitat relationships. In particular, sockeye salmon are commonly observed spawning along shallow shores or margins of the stream channel. It is not clear whether or not this would be included in the proposed “margins without undercut banks” meso habitat category. Units of the riffle-pool sequence are also not fully represented. This is important	In order to be consistent with terminology used in the instream flow study, mesohabitats are defined as general habitat types. We recognize that specialized sub-categories of mesohabitats are particularly important in Grant Creek and agree that more sub-types need to be added to those identified in 2009 study reports. Regarding stratification and random sampling, because of the physical nature of Grant Creek (high gradient, dominance of riffles and cascades), the decision was made (and discussed with the Instream Flow Technical Work Group) to emphasize the identification and sampling of specialized high use habitats rather than attempt stratified random sampling. Quantitative sampling of 90% of the stream would be difficult or impossible. It is our

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				<p>because bed topography (Montgomery et al.; 19992) is an important driver of redd site selection. We realize that, due to its high gradient, Grant Creek is more like a continuous series of rapids. Still, this series is discontinuous and segmented by topographic highs and lows in the longitudinal stream profile. The tailouts of pools and channel bifurcations, although rare in this system, may be important spawning locations as they are in other stream systems. Off-channel habitats also need diversification. There are shallow –water habitats peripheral to both primary and secondary channels that should not be overlooked and there are shallow pond-like habitats present in several locations. These should be included in the mesohabitat classification and their relative distribution should be quantified as is proposed for the other meso habitats.</p>	<p>contention that the use of a statistically rigorous stratified random sampling approach to examine critical factors is not a viable technique under Grant Creek conditions. Targeting known fish use areas was seen as a more efficient and effective means of assessing potential impacts from hydrological changes. The 2009 study program identified high use fish areas that have highly specific characteristics that promote fish use. In most cases, fish observations combined with site specific physical measurements and professional judgment will be adequate to identify probable critical factors.</p> <p>The Aquatic Resources Study Plan was modified to clarify these points.</p>
185	07-06-10	ADFG	3.2.3	<p>Critical factors influential to habitat utilization patterns are difficult to identify and in some cases may not be possible to identify. The proposal is to record fish presence, and by default absence within discrete mesohabitat so that presence can be “correlated” with the specific habitat features (we assume micro habitat features) present at each location sampled. This will require a rigorous stratification of sampling of habitat and the presence and absence of spawning and rearing fish.</p> <p>This stratification will then require a statistical method to analyze the variance microhabitat parameters in mesohabitats utilized and those not. In cases where utilization of particular meso habitats is not consistent, it may be possible to attribute presence to a particular critical factor. In cases where utilization is high in a particular habitat that is rare, it may be difficult to attribute presence to any one particular critical factor. In such cases it will need to be assumed that such habitats are important to the production of fish in Grant Creek and that instream flow needs to support the continued use of these habitats will need to be assessed.</p>	See response to Comment 184.

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186	07-06-10	ADFG	3.2.3	An adequate suite of micro habitat features needs to be surveyed and quantified within occupied meso habitats to support assessments of instream flow needs. This suite of features includes water depth, cover of large wood debris and overhanging vegetation, distance to cover, distance from shore and site-specific water temperature. Water depth allows assessment of the range of depths that are suitable, and most importantly, what depths are needed to support specific life history stages of fish. Cover of living and dead wood provides refugia for young of year and juvenile fish, and distance to shore allows assessment of lateral hydrologic connectivity with undercut banks and shallow banks associated with the main channel. Temperature is a micro-habitat variable that is known to influence the distribution of fish on a seasonal basis and can be used to assess which habitats provide thermal refugia for young of year and juvenile fish.	<p>Comment is noted. Our approach is specifically designed to examine the kinds of factors described in the comment. The Aquatic Resources Study Plan was modified to clarify that a full suite of factors will be considered.</p> <p>Multiple locations in Sections 4.6 and 4.7</p>
187	07-06-10	ADFG	3.2.4	<p>An instream flow technical working group has been formed for this project and recently met in June, 2010 to discuss specific study plans for this proposed project. At these meetings, we learned of the proposal by the applicant to use a variety of instream flow assessment techniques and methodologies. The proposal discussed was to use a physical habitat simulation model (PHABSIM) and a wetted perimeter model.</p> <p>ADF&G supports the meso and micro habitat analyses and their use in developing flow-habitat relationships. We also support the placement of transects at reaches most utilized by fish. We do not, however, support the use of these transects to assess habitat availability or assess habitat utilization. We recommend those procedures outlined in the preceding habitat mapping and critical habitat factors analysis section. As proposed, we have several concerns about the use of PHABSIM to model micro habitat parameters as a function of flow. The use of literature or “library” habitat suitability criteria and curves to model/simulate</p>	<p>See response to Comment 184.</p> <p>We agree that any habitat suitability models taken from the literature for use in Grant Creek analysis will need to be selected carefully to match stream conditions as closely as possible.</p>

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				<p>physical habitat as a function of flow is not expected to yield biologically meaningful estimates. For example, sockeye have been observed by project and agency biologists spawning in shallow, tranquil shoreline conditions, deep and hydraulically turbulent conditions, and within deep pools within the lower reaches of the canyon. It is not likely that literature curves can be used to represent this range of conditions. Furthermore, the curves for sockeye that are available from other Alaskan studies represent a different life history strategy exhibited by sockeye. Available curves for sockeye were developed within groundwater side sloughs of the Susitna River, which differ from Grant Creek in terms of hydrology, hydraulics and water quality. These curves do not appear to be transferrable to Grant Creek.</p> <p>Site-specific habitat suitability criteria (critical factors) could be identified and site-specific curves could be developed but these curves would only be meaningful if the criteria could be demonstrated to influence habitat selection. As stated in our comments on the identification of critical habitat factors, this would require comparative statistical analyses of sites heavily utilized and those with little to no utilization (Railsback; 1993). This would need to be done for each life stage and species whose habitat was being simulated with PHABSIM.</p>	<p>As discussed in the response to Comment 184, a stratified random sampling approach to developing site-specific HS criteria is not considered viable in Grant Creek. Rather, habitat characteristics will be measured at transects placed within known high use fish areas. Habitat suitability models will be developed based on fish presence within these selected areas, supplemented by literature based models, and professional judgment including coordination with the Instream Flow Working Group. All HSI models to be employed in the Grant Creek analysis will be determined in consultation with the Instream Flow Working Group.</p>
188	07-06-10	ADFG	3.2.4	<p>Another issue with the use of PHABSIM for this particular project involves the hydraulic environment of Grant Creek and hydraulic modeling. One dimensional hydraulic modeling with the PHABSIM methodology often leads to a scale mismatch between the scale at which fish are selecting habitat and the scale at which hydraulics are modeled (Kondolf et al.; 20004). In other words, fish may be selecting habitat at scales that cannot be modeled with a one-dimensional PHABSIM model. Although we do not feel this is always the case, the overall roughness, gradient, and resultant hydraulic turbulence of Grant Creek could lead to a PHABSIM model that provides poor predictions of</p>	<p>There are trade-offs associated with 1-D and 2-D modeling. 1-D measurements were collected during the 2010 study period. This information will be presented and its use discussed at an Instream Flow Working Group meeting to be held prior to additional field study.</p>

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				<p>habitat area as a function of flow for this project. Two dimensional (2-D) modeling would allow for more accurate modeling of micro habitat parameters at the scale at which habitats are being selected. Still, if this approach were adopted, the issue with habitat suitability criteria remains. The use of library curves or those developed with professional judgment in conjunction with 2-D modeling can provide more accurate hydraulic modeling if designed, calibrated and developed appropriately, but may result in the inability to credibly attach biological relevance to modeled conditions. In order to identify which criteria influence habitat selection and develop curves that are representative, site-specific measure are needed. And, as described elsewhere in the Aquatic Resources Draft Study Plan, these measures must follow a strict stratification and include sites selected by each species and life stage under study, and those not. Only then can a statistical analysis of the variability in utilization be attributed to particular physical habitat parameters. Curves could then be developed for these criteria and, if used in conjunction with 2-D modeling would yield more realistic predictions of the area of important habitat based on how micro habitat conditions vary with flow.</p>	<p>See responses to Comments 184 and 187.</p>
189	07-06-10	ADFG	3.2.4	<p>Another approach identified in the Aquatic Resources Draft Plan is the use of a wetted perimeter model used to model wetted perimeter, depth and flow relationships. We recommend using these relationships to model the availability of meso habitats (e.g. shallow shorelines) utilized for spawning and rearing and important microhabitat features (e.g. cover) as a function of discharge. We also support the proposed use of these relationships to model thresholds of lateral hydrologic connectivity with lateral refugia and off-channel habitats utilized for spawning and rearing. This is necessary to assess instream flow needs to maintain hydrologic connectivity with habitats important to anadromous and resident fish species. This would allow estimation of how seasonal reductions in</p>	<p>Comment is noted. The Aquatic Resources Study Plan supports this approach.</p>

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				flows would disconnect Grant Creek from important off-channel and channel margin habitat and when important main channel micro habitats, such as wood debris become inaccessible to spawning and rearing fish.	
190	07-06-10	NOAA – Fisheries		NMFS recommends studying the effects of powerhouse operations on instream flows and anadromous fish habitat. This study should include a comprehensive, scale-appropriate analysis of available habitat for spawning and rearing sockeye, Chinook and possible coho salmon in Grant Creek, to determine precisely where, when and to what extent spawning occurs, and an analysis of how that habitat is related to stream flow. (See NMFS comment letter p. 1-2 for full detail of comment.)	The Aquatic Resources Study Program is specifically designed to collect information regarding these potential effects. The environmental analysis in the license application will present effects analysis and any necessary protection, mitigation, and enhancement measures. See responses to comments regarding specific components of the program below.
191	07-06-10	NOAA – Fisheries		The primary life-history functions of Grant Creek by all anadromous fish species are not well understood. (See NMFS comment letter p. 2 for full detail of comment.)	The intent of the Aquatic Resources Study Program is to provide a better understanding of life history functions. See responses to comments regarding specific components of the program.
192	07-06-10	NOAA – Fisheries		For all proposed studies, study designs and sampling methods need to be refined to yield appropriate quantitative estimates of the impacts of project construction and operations on biological productivity and habitat parameters of all anadromous and resident fish species within the Kenai River watershed, as identified in the goals, objectives and impacts, but not addressed completely in the draft study plans.	See response to Comment 136.
193	07-06-10	NOAA – Fisheries		Ecological flow requirements below the dam and below the tailrace need to be designed to avoid or minimize adverse impacts to anadromous fish and their habitat. (See NMFS comment letter p. 2 for full detail of comment.)	The purpose of the Instream Flow Study is to allow prediction of flows that will optimize conditions within the constraints of project engineering requirements. The Aquatic Resources Study Plan was modified to include a quantitative instream flow evaluation of Reach 5 (low flow conditions only) in addition to lower reaches.
194	07-06-10	NOAA – Fisheries		We concur with the U.S. Fish and Wildlife Service's recommendations that objectives should be based on SMART objectives. (See NMFS comment letter p. 2-3 for full detail of comment.)	See response to Comment 136.
195	07-06-10	NOAA – Fisheries		Sediment transport models should be developed under current hydrologic conditions and compared to proposed operational conditions to estimate	See response to Comment 143.

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				project effects on this critical habitat function. (See NMFS comment letter p. 3 for full detail of comment.)	
196	07-06-10	NOAA – Fisheries		Consider 2-D modeling rather than PHABSIM. (See NMFS comment letter p. 3 for full detail of comment.)	See response to Comment 188.
197	07-06-10	NOAA – Fisheries	Need for Additional Information	Grant Creek below Reach 5 is only half mile long. This short reach should be thoroughly inventoried by habitat type and geomorphology. (See NMFS comment letter p. 3 for full detail of comment.)	We agree. The Aquatic Resources Study Program is designed to collect data on habitat type.
198	07-06-10	NOAA – Fisheries	Need for Additional Information	Limited fish sampling for adults and juveniles in the lowest section of Reach 5 indicates the habitat is used by anadromous fish for spawning and rearing, thus this reach will need to be studied to investigate the extent of fish use by all species and life stages, and how changes in flow would affect habitat availability, sediment recruitment, and water quality. (See NMFS comment letter p. 4 for full detail of comment.)	Comment noted. See responses to Comments 143, 173, 174, and 193.
199	07-06-10	NOAA – Fisheries		We recommend that outmigrant smolt trapping occur in addition to winter sampling given the difficulties and possible failure of sampling efforts under heavy snow and ice cover, and the limited types of habitats that can be sampled during the winter season. (See NMFS comment letter p. 4 for full detail of comment.)	See response to Comment 171.
200	07-06-10	NOAA – Fisheries		We recommend that assumptions inherent in using foot surveys and Area Under the Curve methodology to estimate escapement be discussed. (See NMFS comment letter p. 4 for full detail of comment.)	See response to Comment 176.
201	07-06-10	NOAA – Fisheries		We agree with the suggested Chinook spawning telemetry method to locate preferred spawning areas in Grant Creek, as well as the utility in determining if spawning occurs in Reach 5. In addition, we suggest conducting a sockeye telemetry study to determine preferred spawning locations (this should corroborate the visual observations) and to investigate the use by sockeye of Reach 5. (See NMFS comment letter p. 4 for full detail of	See response to Comment 174.

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				comment.)	
202	07-06-10	NOAA – Fisheries		NMFS Comment 13: We suggest a collection method near the mouth of Grant Creek to estimate the production of outmigrating juvenile salmonids and to determine the timing of out-migrating juveniles relative to temperature and flow. Fyke-netting or more robust rotary screw trapping might be successful in such a dynamic setting, and such an outmigrant study should record the full extent of fall and spring juvenile outmigration in order to estimate the magnitude of production originating in Grant Creek, based upon an appropriately designed SMART objective.	See response to Comment 171.
203	07-06-10	NOAA – Fisheries		NMFS recommends that the results of the 2010 studies and 2011 winter sampling and spring outmigrant sampling be presented to agencies for collaborative review and use in determining any necessary additional data needs. (See NMFS comment letter p. 5 for full detail of comment.)	Data from 2010-2011 investigations will be provided for agency review.
204	06-01-10	KAFC	Goals and Objectives	The goals and objectives section does not relate the anticipated impacts and how the studies will address them. The idea that impacts of project operation and construction on fish populations will be answered without specifics is too broad.	See response to Comment 164.
205	06-01-10	KAFC	Goals and Objectives	This section states that construction and operation of the project on the biological productivity and abundance of fish food organisms in Grant Creek and Grant Lake will be addressed. However, there are no real studies of Grant Lake to provide data to deal with this broad objective.	See response to Comments 164 and 178. Zooplankton abundance and Chlorophyll <i>a</i> concentrations were measured in Grant Lake in 2009 to provide a measure of baseline productivity. Additionally, there is substantial historical information available for the limnological characteristics of Grant lake.
206	06-01-10	KAFC	Existing Information	The 2009 studies indicated 231 and 6293 Chinook and sockeye salmon in Grant Creek. Given the exploitation rate of the various fisheries in UCI it would be easy to calculate the production of these stocks. However, there does not appear to be any age composition data presented. Was it collected?	The 2009 study program did not involve the capture of any salmon, consequently age data were not collected. The planned Chinook salmon telemetry study for 2012 will require the capture of fish and allow scale sampling for age determination without additional effort. The Aquatic Resources Study Plan was modified to include the collection of scales for a sample of captured chinook and sockeye salmon.
207	06-01-10	KAFC	Section 2.2	There are several omissions in this section. These include the total lack of studies in Grant Lake, yet this lake will have significant changes in water level.	Zooplankton abundance, Chlorophyll <i>a</i> concentrations, and water chemistry were measured in Grant Lake in 2009 to provide baseline productivity which can be compared to future conditions.

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				The impact of the project on the biological productivity of this system on the structure and function of the lake and surrounding waters is not addressed.	
208	06-01-10	K AFC	Section 2.2	Over 500 Chinook and probably 12-20 thousand sockeye salmon are produced from the Grant Lake/Creek system. There is an extensive data set for the Kenai River on the genetic makeup of the various sub-populations. There are in that data set indications of a number of systems that are very unique – Russian River and Hidden Lake. Are Grant Lake/Grant Creek salmon unique genetically? There are no sample protocols or plan to answer this question. It is an obvious omission.	The collection of tissue samples for genetic analysis would be a worthwhile addition to the study program that can be accomplished at no extra cost (assuming that genetic analysis would be contributed by the ADF&G genetic lab). After consultation with ADF&G, the Aquatic Resources Study Plan was modified to include tissue sampling protocols, if appropriate. Pg. 14 Aquatic Resources Study Plan
209	06-01-10	K AFC	Section 2.2	There is no program to address stream macro-invertebrate drift. Organisms produced in Grant Lake may be important in these evaluations.	See responses to Comments 178 and 207. Additionally, the high gradient of Grant Creek would make the collection of statistically credible drift sampling very difficult.
210	06-01-10	K AFC	Section 3.2.11	The stream life is an important part of making a population estimate. It should be defined for this system by tagging and recovery of salmon. Professional judgment is not precise enough to make a reasonable estimate.	See response to Comment 176.
211	06-01-10	K AFC	Section 3.2.11 and 3.2.1.2	There does not appear to be any studies to age and sex salmon in Grant Creek. This is necessary if one wants to do run reconstruction to get a total production estimate for the Creek. There appears to be a sufficient abundance of salmon to get these data sets.	See response to Comment 206.
212	06-01-10	K AFC	Section 3.2.2.3	The use of a backpack electrofisher should not be used in winter. Delayed mortality has been associated with this method in the Kenai and the abundance of fish may be very concentrated in winter. Therefore, visual means is a better method and should be the only method used besides minnow traps.	This comment directly contradicts ADF&G Comment 183. KHL will follow ADF&G guidance. Electrofishing will be deployed very carefully using programmable shocking equipment and strict protocols to minimize harm. In any event, electrofishing opportunities in the winter will be minimal.
213	06-01-10	K AFC	Table 2	Salmon rearing will be used as a surrogate for resident species rearing and spawning. This is not defensible given the differences in life history and habitat use.	In the high gradient environment of Grant Creek where slow water habitats are scarce, it makes sense to consider small, juvenile fish as a single guild. Fish size and swimming ability are likely more important than species differences.
214	06-01-	K AFC	Section 3.2.5	There are no studies to deal with macroinvertebrate	See response to Comment 209.

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	10			drift and where those organisms are being produced. The role of Grant Lake should be evaluated.	
215	06-01-10	KAFC	Section 3.2.5	The focus of the studies on a number of study reaches and yet only two stations for macroinvertebrates is not acceptable. If the goals are to be realized then more baseline data is needed for each study reach.	See response to Comment 178.
216	07-06-10	ACE		Quantify, by species, the average annual production of juvenile Pacific salmon, rainbow trout and other species of fish that are spawned in Grant Creek and that out-migrate into the greater Kenai River Basin ecosystem, including reaches of the Kenai River located downstream of Kenai Lake.	The draft and final license applications will integrate all the study results and provide estimates of production as part of the required environmental analysis. Smolt outmigration studies, including spring and fall, was added to the study program to assist in this analysis.
217	07-06-10	ACE		Determine and map the locations, characteristics and extent of spawning gravels used by all 5 species of Pacific salmon and rainbow trout in Grant Creek, and to study and document the natural dynamic forces and processes in the Creek that have created and maintained these spawning gravels over time.	The combined efforts of the habitat mapping, instream flow, and geomorphology study components of the Aquatic Resources Study Plan are designed to accomplish this objective.
218	07-06-10	ACE		Determine the importance of fish habitat located in the “canyon section”, that is the reach of Grant Creek that will be de-watered, to spawning, rearing and resident fish species.	The canyon reach will not be de-watered but flow will be significantly reduced. The Aquatic Resources Study Plan was modified to include additional emphasis on the canyon reach. See responses to Comments 164, 165, and 184.
219	07-06-10	ACE		The genetic diversity of salmon species should be considered and maintained.	See response to Comment 208.
220	07-06-10	ACE	PAD	Commercial Fishing - how will these projects impact commercial fishing interests downstream?	See response to Comment 216. Environmental analyses in the draft and final license applications will discuss Grant Creek productivity in the context of regional fisheries.
221	07-06-10	ACE	PAD	Increased erosion from roads and cleared areas. What will the results be? Fish are very sensitive to increases in suspended solids and turbidity.	The draft and final license applications will include a discussion of potential sedimentation impacts related to disturbed areas.
222	07-06-10	M. Cooney	PAD/Study Plan	A study to quantify, by species, the average annual production of juvenile Pacific salmon, rainbow trout and other species of fish that are spawned in Grant Creek and that out-migrate into the greater Kenai River Basin ecosystem, including reaches of the Kenai River located downstream of Kenai Lake. Estimating annual production of juvenile salmon from Grant Creek should be based on actual field	See responses to Comments 216 and 220.

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				sampling (catch and re-catch ratios as necessary) of fry and must not rely on estimates derived from adult spawning escapement combined with non-site specific various computer modeling methods. HEA's fisheries consultant, Northern Ecological Services, has agreed and stated that certain recommended studies (including the one referenced above) and study methodologies would provide more reliable fisheries data than will result from study plans currently proposed by HEA, but has also suggested the applicant (HEA) is unwilling to fund certain recommended studies or study methodologies.	
223	07-06-10	M. Cooney	PAD/Study Plan	A study to determine and map the locations, characteristics and extent of spawning gravels used by all 5 species of Pacific salmon and rainbow trout in Grant Creek, and to determine and document the natural dynamic forces and processes in the Creek that have created and maintained these spawning gravels over time.	See response to Comment 217.
224	07-06-10	M. Cooney	PAD/Study Plan	A study to determine the importance and use of fish habitat located in the "canyon section", (that is the reach 5 of Grant Creek that will be de-watered), to spawning, rearing and survival of anadromous and resident fish species.	See response to Comment 218.
Comments Applicable to All Study Plans					
225	07-09-10	USACOE	All Study Plans	The 404 (b) guidelines [40 CFR 230 404 (b) (1)] require that we assess the potential short-term or long-term effects of a proposed fill activity on the chemical, physical, and biological components of the aquatic environment. To that end, we must have sufficient information to be able to make factual determinations regarding the effects of the proposed discharge. We will utilize all available information in order to make these factual determinations.	Comment noted.
226	07-09-10	USACOE	All Study Plans	Our assessment of impacts to waters of the U.S. is not limited solely to Grant Lake and to Grant Creek. Our evaluation of the effects of the proposed discharge of fill material will encompass the direct effects to waters of the U.S., which includes	Comment noted. The study plans were reviewed as recommended.

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				<p>wetlands, streams, and open waters. In addition, we will also consider the secondary and cumulative effects of the proposed fill on waters of the U.S. The draft study plans should be reviewed to ensure that sufficient information is collected to fully assess the potential effects of the project on waters of the U.S. that may be impacted by the proposed road, utility corridors, or other appurtenant structures.</p>	

List of Abbreviations and Acronyms

ACE	Alaska Center for the Environment
ADF&G	Alaska Department of Fish and Game
ADFG	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AGL	above ground level
APA	Alaska Power Authority
APE	Area of Potential Effect
ATV	all terrain vehicle
AUC	area under the curve
CFR	Code of Federal Regulations
CPUE	catch per unit effort
-D	dimensional
DEC	Alaska Department of Environmental Conservation
DNR	Alaska Department of Natural Resources
FERC	Federal Energy Regulatory Commission
GIS	geographic information system
GMU	Game Management Unit
HEA	Homer Electric Association
HS	habitat suitability
HSI	Habitat Suitability Index
IFIM	Instream Flow Incremental Methodology
INHT	Iditarod National Historic Trail
KAFC	Kenai Area Fisherman's Coalition
KHL	Kenai Hydro, LLC
KPB	Kenai Peninsula Borough
KWF	Kenai Watershed Forum
LLC	limited liability company
LMP	Chugach Land and Resource Management Plan (USFS)
MBTA	Migratory Bird Treaty Act
MIS	Management Indicator Species (USFS)
MSL	mean sea level
MW	megawatt
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NWI	National Wetlands Inventory
PAD	Pre-Application Document (FERC)
PHABSIM	Physical Habitat Simulation Model
PIT	Passive Integrated Transponder
RBCA	Resurrection Bay Conservation Alliance
RGL	Regulation Guidance Letter (USACOE)
ROS	Recreation Opportunity Spectrum
RVRDSP	Recreation and Visual Resources Draft Study Plan
SD1 and SD2	Scoping Document 1 and Scoping Document 2 (FERC)
SMART	Specific Measurable Attainable Relevant Time-bound

SSI	Species of Special Interest (USFS)
TL	total length
TRSP	Terrestrial Resources Study Plan
TWG	technical working group
UCI	Upper Cooke Inlet
USACOE	U.S. Army Corps of Engineers
USFS	U.S. Department of Agriculture Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey